Wekiva Parkway – Section 8
FPID: 240200-4-52-01
Line & Grade
Draft Submittal

Design Documentation

Prepared for:

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March, 2016

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Section 1 – Roadway Design Criteria

Wekiva Parkway – Section 8
FPID: 240200-4-52-01
Line & Grade
Roadway Design Criteria

Design Element	Design Standard	Sources/Notes
Design Year	2040	PD&E (Draft PER Dated May 2015)
Design Vehicle	WB-62FL WB-67	-PPM Vol. 1, P 1-19 -AASHTO, Exhibit 2-1, P 17
Design Speed Wekiva Parkway (Urban Freeway) SR 400 (I-4) C-D Roads SR 400 (I-4) (70) (Mainline and Express) SR 400 (I-4) C-D Roads Directional Ramps Loop Ramps Loop Ramp to Rinehart Road	 70 mph 55 mph 70 mph 55 mph 50 mph 35mph 30mph	-PPM Vol. 1, Tbl. 1.9.1 & 1.9.2 (SIS)
Horizontal Alignment		
Maximum Curvature (Degree of Curve) Wekiva Parkway (Urban) (70) SR 400 (I-4) (70) (Mainline and Express) SR 400 (I-4) C-D Roads (55) Directional Ramps (50) Loop Ramps (35) Loop Ramp to Rinehart Road (30)	 3° 00’ 00” 3° 00’ 00” 6° 30’ 00” 8° 15’ 00” 17° 45’ 00” 24° 45’ 00”	-PPM Vol. 1, Tbl 2.8.3
Maximum Deflection without Horizontal Curve Wekiva Parkway (Urban) (70) SR 400 (I-4) (70) (Mainline and Express) SR 400 (I-4) C-D Roads (55) Directional Ramps (50) Loop Ramps (35) Loop Ramp to Rinehart Road (30)	 0° 45’ 00” 0° 45’ 00” 0° 45’ 00” 0° 45’ 00” 2° 00’ 00” 2° 00’ 00”	-PPM Vol 1, Tbl 2.8.1a
Minimum Length of Horizontal Curve Wekiva Parkway (Urban) (70) SR 400 (I-4) (70) (Mainline and Express) SR 400 (I-4) C-D Roads (55) Directional Ramps (50) Loop Ramps (35) Loop Ramp to Rinehart Road (30)	**Desirable** **Minimum** 2100 ft (30V) 1050 ft (15V) 2100 ft (30V) 1050 ft (15V) 825 ft (15V) 400 ft 750 ft (15V) 400 ft 525 ft (15V) 400 ft 450 ft (15V) 400 ft	-PPM Vol 1, Tbl 2.8.2a
Minimum Stopping Sight Distance (FDOT) Wekiva Parkway (Urban) (70)	 820 ft	-PPM Vol 1, Tbl 2.7.1

Design Element	Design Standard	Sources/Notes
SR 400 (I-4) (70) (Mainline and Express)	820 ft	(adjustment for grades will be required)
Directional Ramps (50)	425 ft	
Loop Ramps (35)	250 ft	
Loop Ramp to Rinehart Road (30)	200 ft	
Minimum Stopping Sight Distance (AASHTO)		-AASHTO, Exhibit 3-1, P 112
Wekiva Parkway (Urban) (70)	730 ft	(adjustment for grades will be required)
SR 400 (I-4) (70) (Mainline and Express)	730 ft	
SR 400 (I-4) C-D Roads (55)	495 ft	
Directional Ramps (50)	425 ft	
Loop Ramps (35)	250 ft	
Loop Ramp to Rinehart Road (30)	200 ft	
Lane Drop Taper		
Interstate	70: 1 (50:1 Min)	-AASHTO, P 818
All other		
30 mph - 45mph	1:30	-Design Standards Index No. 526
>45 mph	1:40	
Accel	300’ Min	-AASHTO, Figure 10-69, P 845
Decel Lanes	250’ Min	-AASHTO, Figure 10-72, P 850
Add Lane Taper		
Interstate		
Tangent	300 ft	-AASHTO, Figure 10-52 (B2), P 816
Curve	100 ft	-AASHTO, P856
All Other		
30 mph – 45 mph	50 ft	-Design Standards Index No. 526
>45 mph	50 ft	
Minimum Spacing Ramp Terminals		
Entrance to Exit		
System to Service	2000 ft	-AASHTO, Figure 10-68, P 844
Service to Service	1600 ft	
Exit to Entrance		
Freeway	500 ft	
CD/Frontage Rd.	400 ft	
Entrance to Entrance		
Freeway	1000 ft	
CD/Frontage Rd	800 ft	
Exit to Exit		
Freeway	1000 ft	
CD/Frontage Rd	800 ft	
Turning Roadways		
System Interchange	800 ft	
	600 ft	

Design Element	Design Standard	Sources/Notes
Service Interchange		
Entrance and Exit Ramp Design Entrance Acceleration Lengths 50 mph to 70 mph 35 mph to 70 mph 30 mph to 70 mph Exit Deceleration Lengths 70 mph to 50 mph 70 mph to 35 mph 70 mph to 30 mph Tapers	 580 ft +Taper (Single Lane) 1230 ft +Taper (Single Lane) 1350 ft +Taper (Single Lane) 340 ft +Taper (Single Lane) 490 ft +Taper (Single Lane) 520 ft +Taper (Single Lane) Tapered Design, Single Lane: 2° to 5° Parallel Design, Single Lane: 250 ft Min	 -AASHTO, Exhibits 10-69 & 10-70, P 845 & 847 -AASHTO, Exhibits 10-72 &, 10-73, P 850 & 851 -Design Standard Index No. 525 -AASHTO, Exhibit 10-72, P 850
Limited Access Limits Rural Urban Crossroad Overpass/No Interchange	 300 ft 100 ft 200 ft	-PPM Vol 1, Section 2.14.1
Maximum Profile Grade Wekiva Parkway (Urban) (70) SR 400 (I-4) (70) (Mainline and Express) SR 400 (I-4) C-D Roads (55) Directional Ramps (50) Loop Ramps (35) Loop Ramp to Rinehart Road (30)	 3% 3% 5% 5% 6% 7%	-PPM Vol 1, Tbl 2.6.1
Maximum Change in Grade w/o Curve Wekiva Parkway (Urban) (70) SR 400 (I-4) (70) (Mainline and Express) SR 400 (I-4) C-D Roads (55) Directional Ramps (50) Loop Ramps (35) Loop Ramp to Rinehart Road (30)	 0.2 0.2 0.5 0.6 0.9 1.0	-PPM Vol 1, Tbl 2.6.2
Minimum Grade (shoulder gutter, barrier wall, curb & gutter)	0.3%	-PPM Vol 1, Tbl 2.6.4
Crest Vertical Curve (FDOT) Wekiva Parkway (Urban) (70) SR 400 (I-4) (70) (Mainline and Express) SR 400 (I-4) C-D Roads (55) Directional Ramps (50)	 K=506, Min Length=1000 ft (1800 ft within Interchange) K=506, Min Length=1000 ft (1800 ft within Interchange) K=185, Min Length=350 ft K=136, Min Length=300 ft	-PPM Vol 1, Tbl 2.8.5

Design Element	Design Standard	Sources/Notes
Loop Ramps (35) Loop Ramp to Rinehart Road (30)	K=47, Min Length=105 ft K=31, Min Length=90 ft	
Crest Vertical Curve (AASHTO) Wekiva Parkway (Urban) (70) SR 400 (I-4) (70) (Mainline and Express) SR 400 (I-4) C-D Roads (55) Directional Ramps (50) Loop Ramps (35) Loop Ramp to Rinehart Road (30)	 K=247, Min Length=210 ft K=247, Min Length=210 ft K=114, Min Length=165 ft K=84, Min Length=150 ft K=29, Min Length=105 ft K=19, Min Length=90 ft	 -AASHTO, Exhibit 3-73 , P 272 -AASHTO, P 269
Sag Vertical Curve (FDOT) Wekiva Parkway (Urban) (70) SR 400 (I-4) (70) (Mainline and Express) SR 400 (I-4) C-D Roads (55) Directional Ramps (50) Loop Ramps (35) Loop Ramp to Rinehart Road (30)	 K=206, Min Length=800 ft K=206, Min. Length=800 ft K=115, Min Length=250 ft K=96, Min Length=200 ft K=49, Min Length=105 ft K=37, Min Length=90 ft	-PPM Vol 1, Tbl 2.8.6
Sag Vertical Curve (AASHTO) Wekiva Parkway (Urban) (70) SR 400 (I-4) (70) (Mainline and Express) SR 400 (I-4) C-D Roads (55) Directional Ramps (50) Loop Ramps (35) Loop Ramp to Rinehart Road (30)	 K=181, Min Length=210 ft K=181, Min Length=210 ft K=15, Min Length=165 ft K=96, Min Length=150 ft K=49, Min Length=105 ft K=37, Min Length=90 ft	 -AASHTO, Exhibit 3-75, P 277 -AASHTO, P 276
Minimum Vertical Clearance Over Roadway Over Railroad Overhead Signs Structures Overhead Dynamic Message Sign Structures	 16.5 ft 23.5 ft 17.5 ft 19.5 ft	-PPM Vol 1, Tbls 2.10.1, 2.10.2
Lane Widths Wekiva Parkway (Urban) (70) SR 400 (I-4) (70) (Mainline and Express) Ramp (One Lane) Ramp (Two Lanes)	 12 ft – Tangent 12 ft - Tangent 15 ft - Tangent 24 ft - Tangent	-PPM Vol 1, Tbls 2.1.1, 2.1.3
Shoulder Widths Wekiva Parkway (3 lanes) Wekiva Parkway (2 lanes) SR 400 (I-4) (70) (Mainline and	**Inside Total/Paved** / **Outside Total/Paved** 12/10 / 12/10 8/4 / 12/10 12/10 / 12/10	-PPM Vol 1, Tbls 2.3.1 & 2.3.4 **4' inside shoulder width design variation**

Design Element	Design Standard	Sources/Notes
Express) Ramp (One Lane) Ramp (Two lanes)	 6/2 6/4 8/4 12/10	**approved for express lanes**
Cross Slope Roadway(Two Lane) Roadway (Three Lane) Shoulder (Outside) Shoulder (Inside)	 0.02, 0.02 0.02, 0.02, 0.03 0.06 0.05	-PPM Vol 1, Figures 2.1.1, 2.3.1, 2.3.1A
Maximum Lane Roll-Over	4%	-PPM Vol 1, Figure 2.1.1 -PPM Vol 1, Section 2.1.5
Maximum Lane Roll-Over @ Terminal	≥ 35 mph: 5% < 35 mph: 6%	-PPM Vol 1, Tbl 2.1.4
Maximum Shoulder Roll- Over	7%	-Design Standard Index No. 510 -PPM Vol 1, Figure 2.3.1.A
Clear Zone Wekiva Parkway (Urban) (70) SR 400 (I-4) (70) (Mainline and Express) SR 400 (I-4) C-D Roads (55) Directional Ramps (50) Loop Ramps (30)	 36 ft 36 ft 30 ft 14-24 ft (1 to 2 Lanes) 10-18 ft (1 to 2 Lanes)	-PPM Vol 1 Tbl 4.2.1 -Design Standard Index No. 700
Border Width Freeway & Ramps	 94 ft	-PPM Vol 1, Tbl 2.5.3 **15ft border width design variation approved for freeway and ramps**
Roadside Slopes Rural & Urban Freeways, Rural Arterials & Collectors Urban Arterials and Collectors with C & G	**Fill Height** **Front slope** 0–5 1:6 5– 10 1:6 to CZ & 1:4 10–20 1:6 to CZ & 1:3 >20 1:2 w/Guardrail **Back Slope** 1:4 or 1:3 w/Trapezoidal Ditch & 1:6 Front Slope **Front Slope** 1:2 or to suit property owner, not flatter than 1:6 **Back Slope** 1:2 or to suit property owner, not flatter than 1:6	-PPM Vol 1, Table 2.4.1
Superelevation Transition Distribution Tangent	**Standard** **Min/Max** 80% 50%	-PPM Vol 1, Section 2.9

Design Element	Design Standard		Sources/Notes
Curve	20%	50%	
Superelevation Rates	**e Max**	**Transition/Min L**	-PPM Vol 1, Tbls 2.9.3 & 2.9.4, P 2-53
Wekiva Parkway (Urban) (70)	0.10	1:200/100 ft	
SR 400 (I-4) (70) (Mainline and Express)	0.10	1:200/100 ft	
SR 400 (I-4) C-D Roads (55)	0.10	1:225/100 ft	
Directional Ramps (50)	0.10	1:200/100 ft	
Loop Ramps (35)	0.10	1:175/100 ft	
Loop Ramp to Rinehart Road (30)	0.10	1:100/50 ft	

This Design Criteria has been developed utilizing the following sources:

- FDOT Plans Preparation Manual Volume I Dated January 2016
- FDOT Design Standards Dated July 2016
- AASHTO, A Policy on Geometric Design of Highways and Streets Dated 2004
- Florida's Turnpike General Tolling Requirments (GTR) Volume I Design Criteria and Process Dated October 2015

This design criteria is in general agreement with the criteria established in the Wekiva Parkway/SR 46 Realignment PD&E Study, Preliminary Engineering Report dated May 2015.

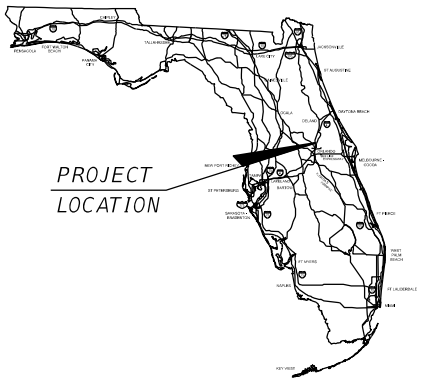
Section 2 – Typical Section Package

PROJECT IDENTIFICATION

FINANCIAL PROJECT ID: 240200-4-52-01 COUNTY (SECTION): SEMINOLE, 77

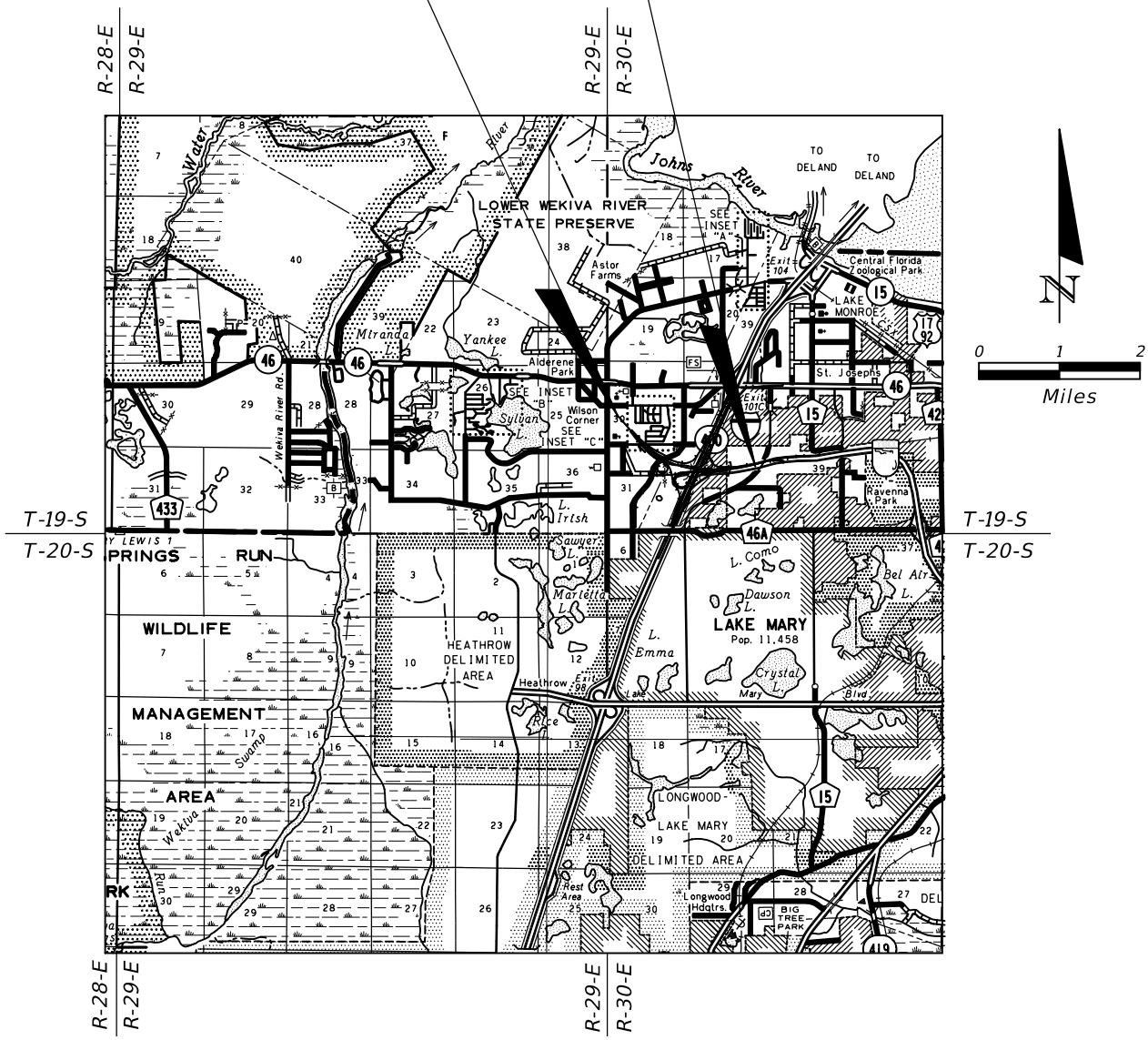
PROJECT DESCRIPTION: WEKIVA PARKWAY FROM 0.028 MI EAST OF ORANGE BLVD. TO SR 417/I-4 INTCHG MODIFICATION. (PROJ. LENGTH 1.949 MI)

PROJECT LOCATION



END PROJECT 240200-4-52-01
STA. 1217+80.71 (BK) =
STA. 2169+83.96 (AH)

BEGIN PROJECT 240200-4-52-01
STA. 1114+56.17 (BK) =
STA. 1114+87.25 (AH)



WEKIVA PARKWAY/SR 400 (I-4) INTERCHANGE
15% LINE & GRADE
SECTION 8

PROJECT IDENTIFICATION

FINANCIAL PROJECT ID: 240200-4-52-01 COUNTY (SECTION): SEMINOLE, 77

PROJECT DESCRIPTION: WEKIVA PARKWAY FROM 0.028 MI EAST OF ORANGE BLVD. TO SR 417/I-4 INTCHG MODIFICATION. (PROJ. LENGTH 1.949 MI)

PROJECT CONTROLS

FUNCTIONAL CLASSIFICATION

( ) RURAL

(X) URBAN

(X) FREEWAY/EXPWY. ( ) MAJOR COLL.

( ) PRINCIPAL ART. ( ) MINOR COLL.

( ) MINOR ART. ( ) LOCAL

HIGHWAY SYSTEM

Yes	No	
( )	(X)	NATIONAL HIGHWAY SYSTEM
(X)	( )	FLORIDA INTRASTATE HIGHWAY SYSTEM
(X)	( )	STATE HIGHWAY SYSTEM
( )	(X)	OFF STATE HIGHWAY SYSTEM

ACCESS CLASSIFICATION

(X) 1 - FREEWAY

( ) 2 - RESTRICTIVE w/Service Roads

( ) 3 - RESTRICTIVE w/660 ft. Connection Spacing

( ) 4 - NON-RESTRICTIVE w/2640 ft. Signal Spacing

( ) 5 - RESTRICTIVE w/440 ft. Connection Spacing

( ) 6 - NON-RESTRICTIVE w/1320 ft. Signal Spacing

( ) 7 - BOTH MEDIAN TYPES

CRITERIA

(X) NEW CONSTRUCTION / RECONSTRUCTION

( ) RRR INTERSTATE / FREEWAY

( ) RRR NON-INTERSTATE / FREEWAY

( ) TDLC / NEW CONSTRUCTION / RECONSTRUCTION

( ) TDLC / RRR

( ) MANUAL OF UNIFORM MINIMUM STANDARDS (FLORIDA GREENBOOK) (OFF-STATE HIGHWAY ONLY)

TRAFFIC

	YEAR	AADT
CURRENT	2016	-
OPENING	2020	43,000
DESIGN	2040	82,500

DESIGN SPEED: 70 MPH

POSTED SPEED: 70 MPH

DISTRIBUTION

K 9.00%

D 56.42%

T_{24} 10.52%

DESIGN SPEED APPROVALS

DISTRICT DESIGN ENGINEER _____ DATE _____

DISTRICT TRAFFIC OPERATIONS ENGINEER _____ DATE _____

LIST ANY POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION ELEMENTS:

- 4' INSIDE SHOULDER WIDTH DESIGN VARIATION APPROVED FOR EXPRESS LANES
- 15' BORDER WIDTH DESIGN VARIATION APPROVED FOR RAMPS

LIST MAJOR STRUCTURES LOCATION/DESCRIPTION - REQUIRING INDEPENDENT STRUCTURE DESIGN:

SR 429 STRUCTURES OVER:

- WILSON RD.
- INTERNATIONAL PKWY. (INCLUDING OVER LAKE STEN)
- TOWNE CENTER BLVD.
- RINEHART RD.

I-4 STRUCTURES OVER:

- SR 429
- SR 46 (BRIDGE WIDENING)

I-4/SR 429 SYSTEMS INTCHG

- RAMP FLYOVERS

LIST MAJOR UTILITIES WITHIN PROJECT CORRIDOR:

- AT&T FLORIDA
- AT&T CORPORATION
- BRIGHT HOUSE NETWORKS, LLC
- CITY OF SANFORD, FLORIDA
- COMCAST COMMUNICATIONS
- FLORIDA GAS TRANSMISSION
- FLORIDA POWER & LIGHT (DISTRIBUTION)
- FLORIDA POWER & LIGHT (TRANSMISSION)
- FLORIDA PUBLIC UTILITIES
- SEMINOLE COUNTY ENVIRONMENTAL SERVICES
- SEMINOLE COUNTY TRAFFIC

LIST OTHER INFORMATION PERTINENT TO DESIGN OF PROJECT:

SECTION INCLUDES THE RECONSTRUCTION OF THE SR 417/I-4 INTERCHANGE TO A MULTI-LEVEL DIRECTIONAL INTERCHANGE.

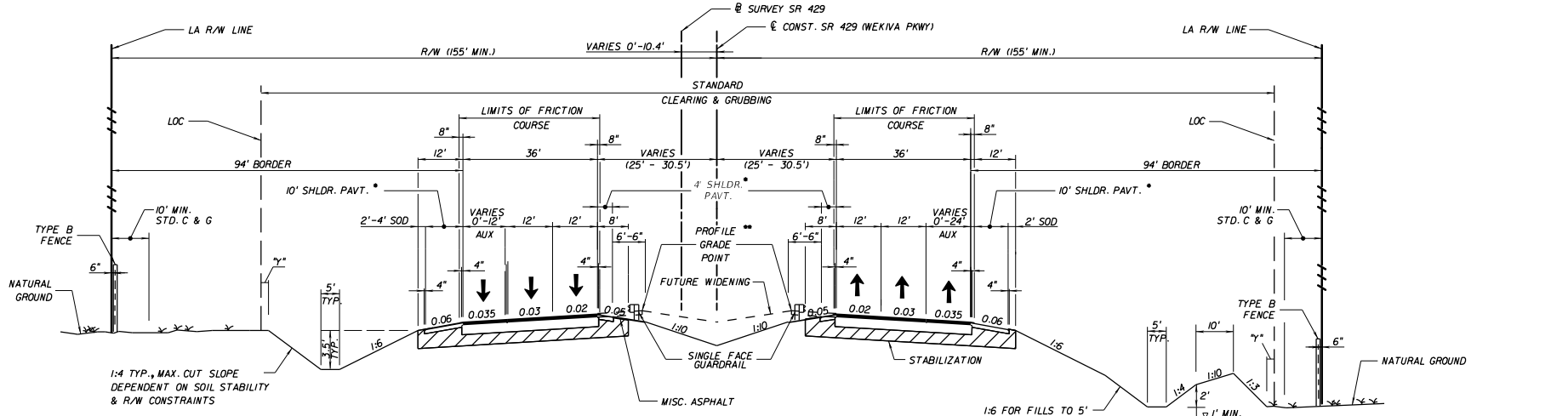
PROJECT IDENTIFICATION

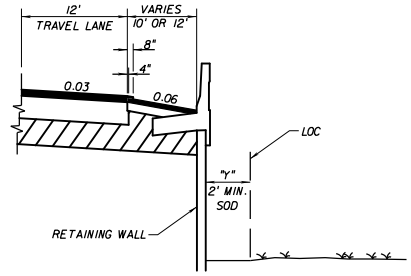
FINANCIAL PROJECT ID 240200-4-52-01 FEDERAL AID PROJECT NO. TBD

COUNTY NAME SEMINOLE ROAD DESIGNATION SR 429 LIMITS/MILEPOST NEW ALIGNMENT

PROJECT DESCRIPTION WEKIVA PARKWAY FROM 0.028 MI EAST OF ORANGE BLVD. TO SR 417/I-4 INTERCHANGE MODIFICATION (PROJ. LENGTH 1.949 MI)

PROPOSED ROADWAY TYPICAL SECTION





SHOULDER PAVEMENT & RETAINING WALL DETAIL

* WITH GROUND-IN RUMBLE STRIPS.

NOTES:
(1) "Y" THE AREA DISTURBED VARIES, 2' MIN.

SR 429 (WEKIVA PKWY)

STA. 1114+56.17 (BK) / STA. 1114+87.25 (AH) TO STA. 1217+80.71 (BK) / 2169+83.96 (AH)

4-LANE URBAN EXPRESSWAY
DS = 70 MPH

APPROVED BY: Engineer of Record Printed Name	FDOT CONCURRENCE	FHWA CONCURRENCE
William A. Terwilleger P.E. 43427 Date Engineer Of Record	Printed Name Date FDOT District Design Engineer	Printed Name Date FHWA Transportation Engineer

PROJECT IDENTIFICATION

FINANCIAL PROJECT ID 240200-4-52-01 FEDERAL AID PROJECT NO. TBD

COUNTY NAME SEMINOLE ROAD DESIGNATION SR 429 LIMITS/MILEPOST NEW ALIGNMENT

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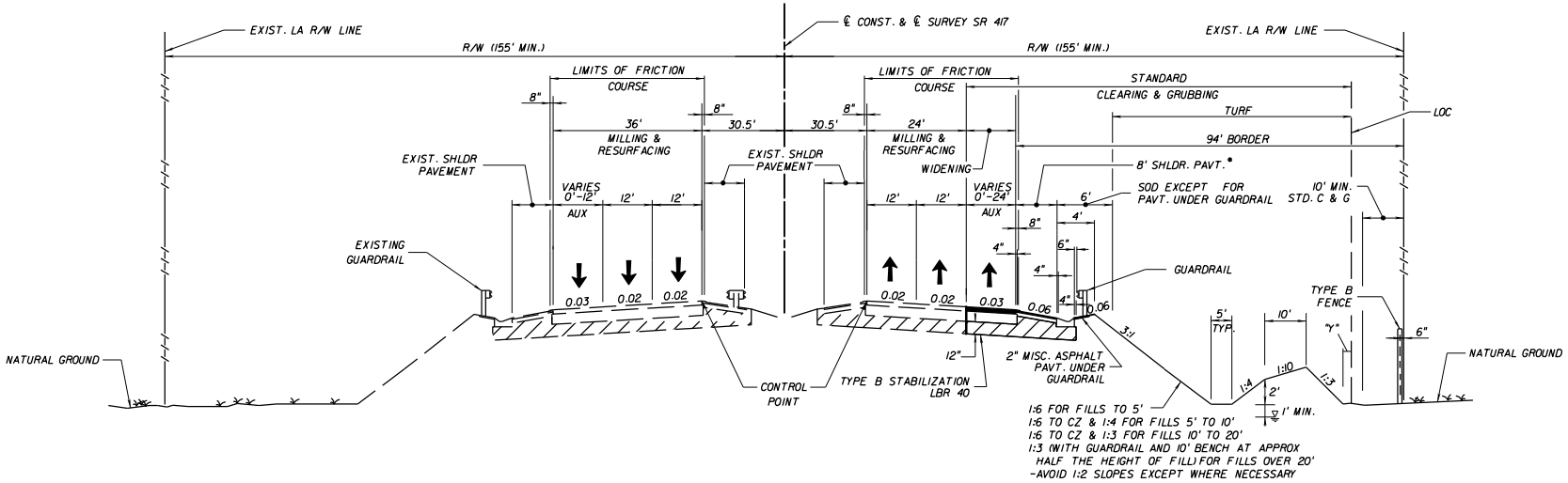
PROPOSED ROADWAY TYPICAL SECTION



SR 417

STA. 1217+80.71 (BK) / STA. 2169+83.96 (AH) TO STA. 2198+78.76

4-LANE URBAN EXPRESSWAY
DS = 70 MPH

* WITH GROUND-IN RUMBLE STRIPS.

NOTES:
(1) "Y" THE AREA DISTURBED VARIES, 2' MIN.

APPROVED BY: Engineer of Record Printed Name	FDOT CONCURRENCE	FHWA CONCURRENCE
William A. Terwilleger P.E. 43427 Date Engineer Of Record	Printed Name Date FDOT District Design Engineer	Printed Name Date FHWA Transportation Engineer

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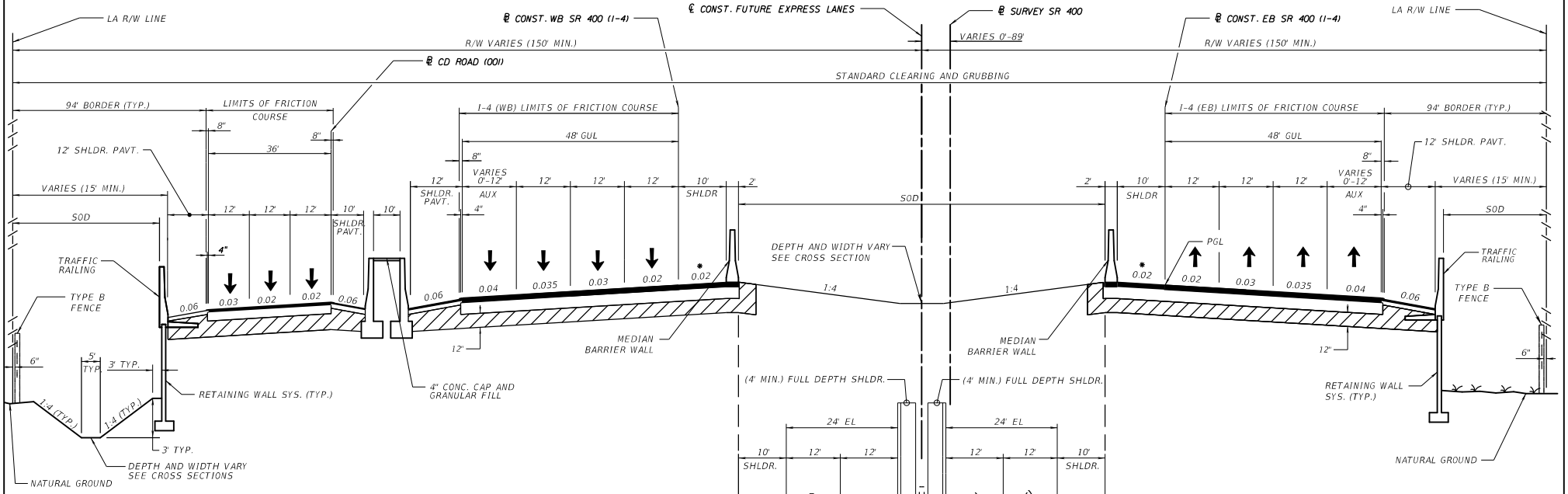
PROJECT IDENTIFICATION

FINANCIAL PROJECT ID 240200-4-52-01 FEDERAL AID PROJECT NO. TBD

COUNTY NAME SEMINOLE ROAD DESIGNATION I-4 LIMITS/MILEPOST NEW ALIGNMENT

PROJECT DESCRIPTION WEKIVA PARKWAY FROM 0.028 MI EAST OF ORANGE BLVD. TO SR 417/I-4 INTERCHANGE MODIFICATION (PROJ. LENGTH 1.949 MI)

PROPOSED ROADWAY TYPICAL SECTION



* THE SHOULDER SHALL SLOPE TOWARDS THE BARRIER WALL WHERE $1.5\% < G \leq 3\%$. A TYPICAL SECTION DEPICTING THIS EXCEPTION IS NOT INCLUDED

CD ROAD (0011)
STA. 133+14.56 TO 212+50.00
3-LANE URBAN CD ROAD
DS = 55 MPH

INTERSTATE 4 (SR 400)
WB: STA. 2037+10.27 TO 2134+00.99
EB: STA. 1025+61.49 TO 1134+44.43
6-LANE URBAN FREEWAY
DS = 70 MPH

APPROVED BY: Engineer of Record Printed Name	FDOT CONCURRENCE	FHWA CONCURRENCE
William A. Terwilleger P.E. 43427 Date Engineer Of Record	Printed Name Date FDOT District Design Engineer	Printed Name Date FHWA Transportation Engineer

PROJECT IDENTIFICATION

FINANCIAL PROJECT ID 240200-4-52-01 FEDERAL AID PROJECT NO. TBD

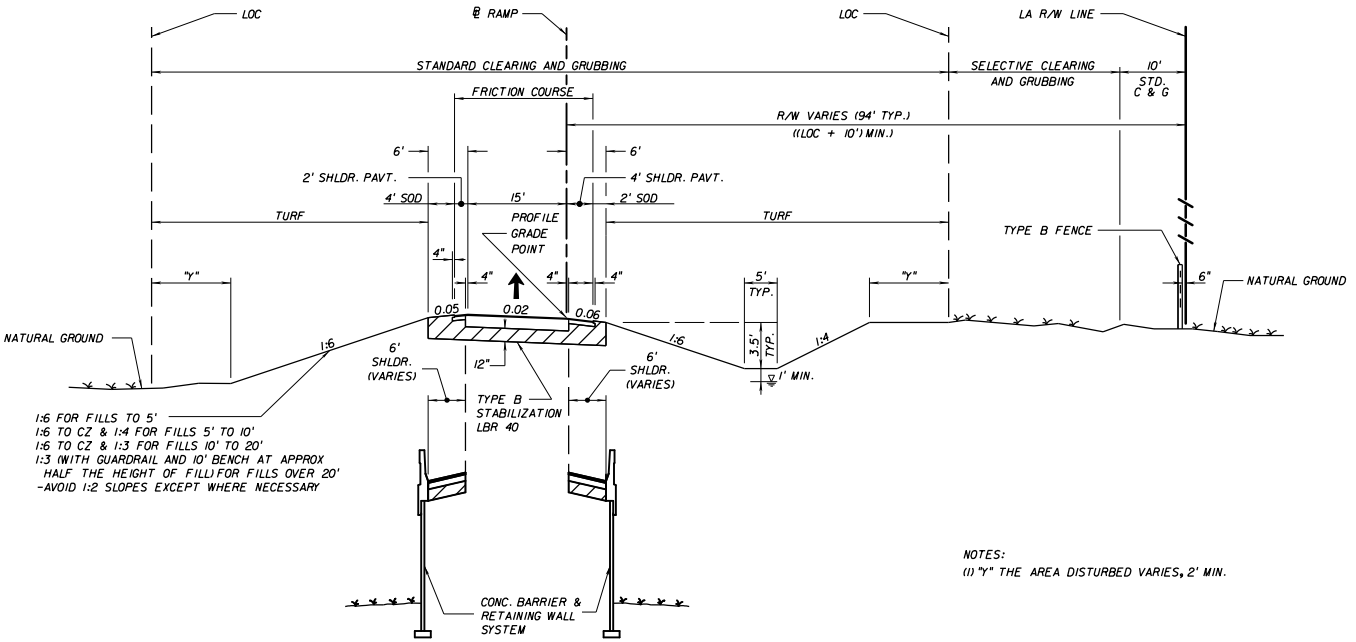
COUNTY NAME SEMINOLE ROAD DESIGNATION I-4 LIMITS/MILEPOST NEW ALIGNMENT

PROJECT DESCRIPTION WEKIVA PARKWAY FROM 0.028 MI EAST OF ORANGE BLVD. TO SR 417/I-4 INTERCHANGE MODIFICATION (PROJ. LENGTH 1.949 MI)

PROPOSED ROADWAY TYPICAL SECTION

RAMPS:
"003" (STA. 10+00.00 TO 61+77.51)
"004" (STA. 5+70.01 TO 35+45.62)
"HH1" (STA. 10+00.00 TO 56+85.79)
"HH2" (STA. 6+69.89 TO 20+57.78)
"LL1" (STA. 10+00.00 TO 60+40.72)
"LL2" (STA. 10+00.00 TO 54+54.22)
"LL3" (STA. 8+68.82 TO 50+98.35)
"MM2" (STA. 10+00.00 TO 35+65.28)
"NN2" (STA. 10+00.00 TO 56+26.89)
"GG" (STA. 10+00.00 TO 40+04.15)
"RR" (STA. 10+00.00 TO 18+10.78)
"CR 46A" (STA. 4+68.13 TO 19+41.62)

ONE LANE RAMP
DS = 35-50 MPH



NOTES:
(1) "Y" THE AREA DISTURBED VARIES, 2' MIN.

APPROVED BY: Engineer of Record Printed Name	FDOT CONCURRENCE	FHWA CONCURRENCE
William A. Terwilleger P.E. 43427 Date Engineer Of Record	Printed Name Date FDOT District Design Engineer	Printed Name Date FHWA Transportation Engineer

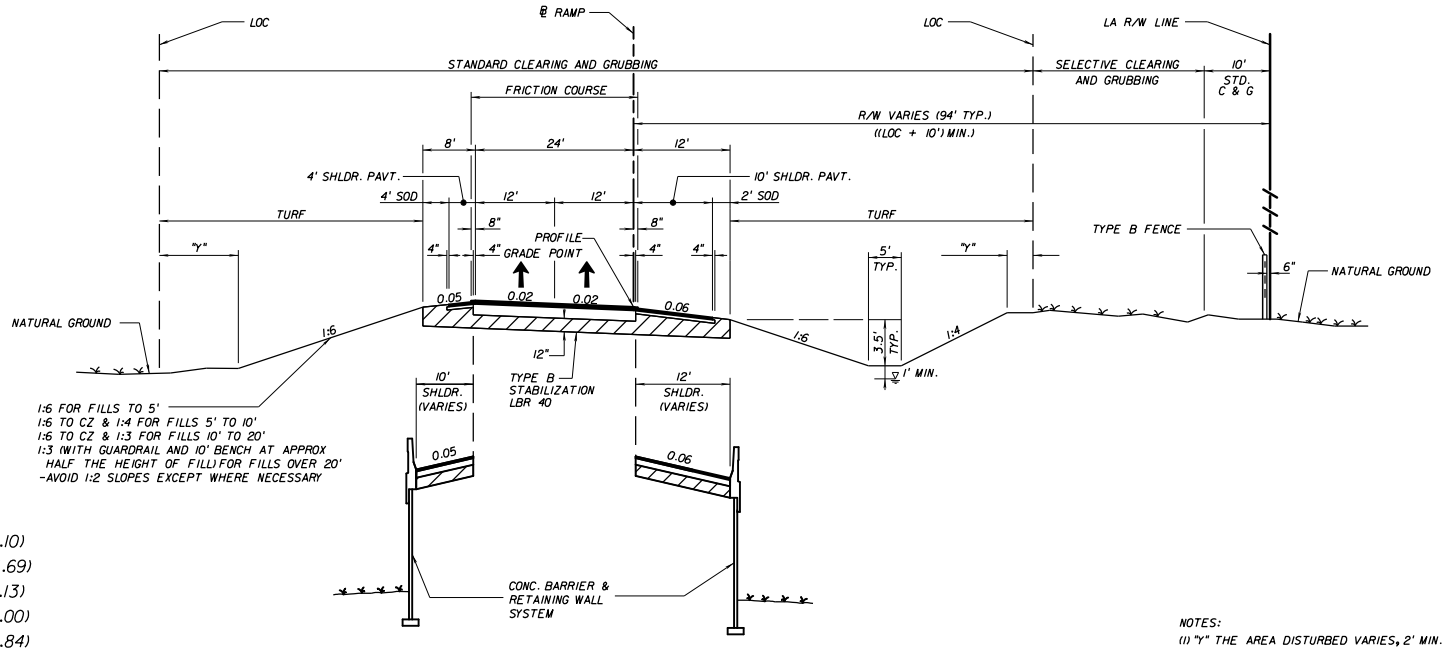
PROJECT IDENTIFICATION

FINANCIAL PROJECT ID 240200-4-52-01 FEDERAL AID PROJECT NO. TBD

COUNTY NAME SEMINOLE ROAD DESIGNATION I-4 LIMITS/MILEPOST NEW ALIGNMENT

PROJECT DESCRIPTION WEKIVA PARKWAY FROM 0.028 MI EAST OF ORANGE BLVD. TO SR 417/I-4 INTERCHANGE MODIFICATION (PROJ. LENGTH 1.949 MI)

PROPOSED ROADWAY TYPICAL SECTION



RAMPS:

"MM1" (STA. 10+00.00 TO 81+53.10)
"MM3" (STA. 10+00.00 TO 55+67.69)
"NN1" (STA. 10+00.00 TO 76+94.13)
"001" (STA. 134+10.06 TO 215+14.00)
"002" (STA. 10+00.00 TO 26+79.84)

TWO LANE RAMP
DS = 35-50 MPH

NOTES:
(1) "Y" THE AREA DISTURBED VARIES, 2' MIN.

APPROVED BY: Engineer of Record Printed Name	FDOT CONCURRENCE	FHWA CONCURRENCE
William A. Terwilleger P.E. 43427 Date Engineer Of Record	Printed Name Date FDOT District Design Engineer	Printed Name Date FHWA Transportation Engineer

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PROJECT IDENTIFICATION

FINANCIAL PROJECT ID 240200-4-52-01 FEDERAL AID PROJECT NO. TBD

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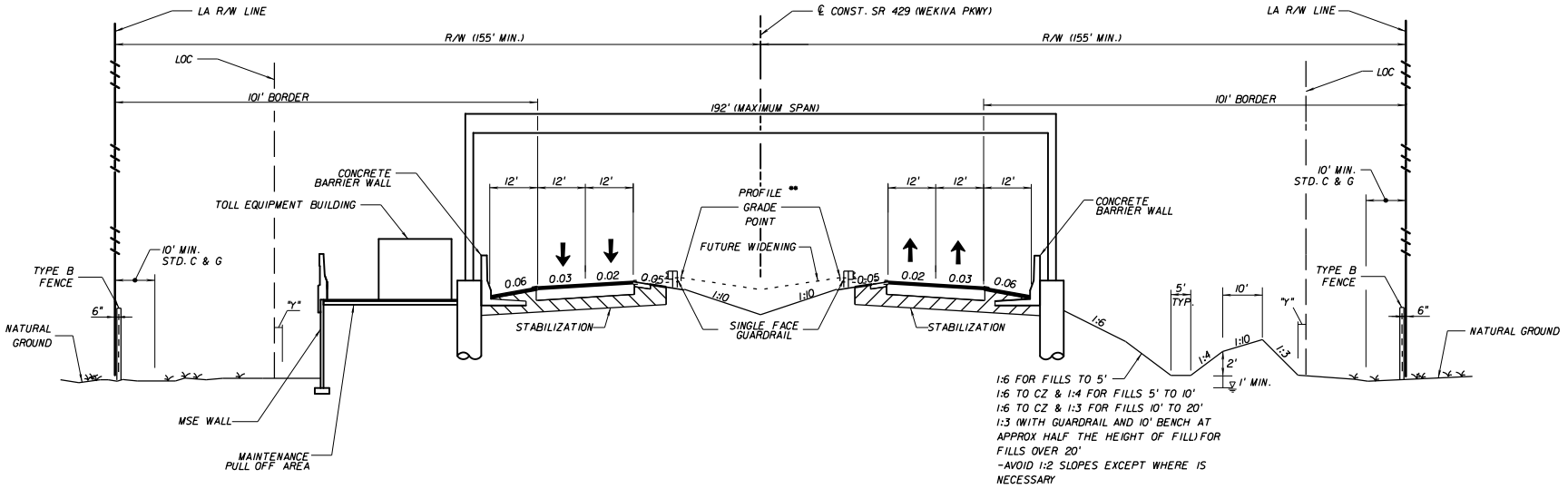
PROJECT DESCRIPTION WEKIVA PARKWAY FROM 0.028 MI EAST OF ORANGE BLVD. TO SR 417/I-4 INTERCHANGE MODIFICATION (PROJ. LENGTH 1.949 MI)

PROPOSED ROADWAY TYPICAL SECTION
(SINGLE SPAN GANTRY FOR TOLL SITE LOCATION)



SR 429 (WEKIVA PKWY) GANTRY LOCATION

4-LANE URBAN EXPRESSWAY
DS = 70 MPH

* WITH GROUND-IN RUMBLE STRIPS.

NOTES:
(1) "Y" THE AREA DISTURBED VARIES, 2' MIN.

APPROVED BY: Engineer of Record Printed Name	FDOT CONCURRENCE	FHWA CONCURRENCE
William A. Terwilleger P.E. 43427 Date Engineer Of Record	Printed Name Date FDOT District Design Engineer	Printed Name Date FHWA Transportation Engineer

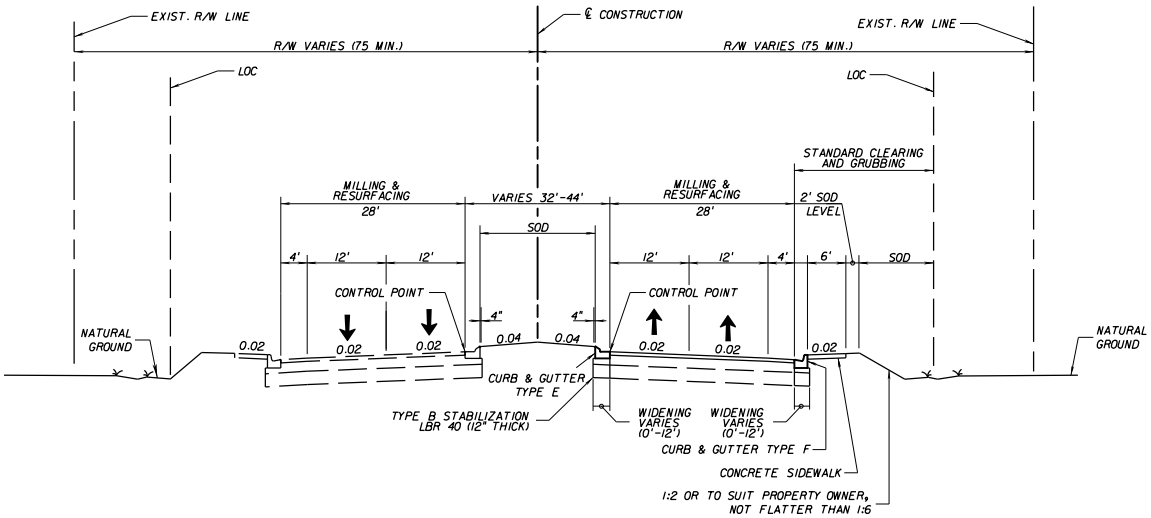
PROJECT IDENTIFICATION

FINANCIAL PROJECT ID 240200-4-52-01 FEDERAL AID PROJECT NO. TBD

COUNTY NAME SEMINOLE ROAD DESIGNATION SR 429 LIMITS/MILEPOST NEW ALIGNMENT

PROJECT DESCRIPTION WEKIVA PARKWAY FROM 0.028 MI EAST OF ORANGE BLVD. TO SR 417/I-4 INTERCHANGE MODIFICATION (PROJ. LENGTH 1.949 MI)

PROPOSED ROADWAY TYPICAL SECTION



INTERNATIONAL PARKWAY

STA. 99+70.36 TO STA. 118+36.42

TWO LANE URBAN ROAD

DS = 45 MPH

NOTES:
(1) IF LIMITS OF CONSTRUCTION EXCEED RIGHT OF WAY A PROPERTY AGREEMENT IS REQUIRED.

APPROVED BY: Engineer of Record Printed Name	FDOT CONCURRENCE	FHWA CONCURRENCE
William A. Terwilleger P.E. 43427 Date Engineer Of Record	Printed Name Date FDOT District Design Engineer	Printed Name Date FHWA Transportation Engineer

PROJECT IDENTIFICATION

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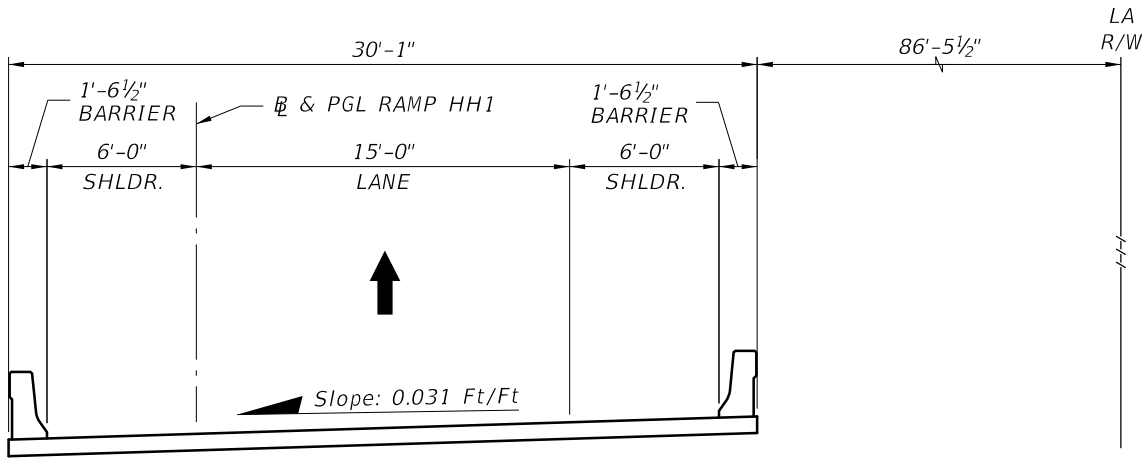
COUNTY NAME SEMINOLE ROAD DESIGNATION SR 429 LIMITS/MILEPOST NEW ALIGNMENT

PROJECT DESCRIPTION WEKIVA PARKWAY FROM 0.028 MI EAST OF ORANGE BLVD. TO SR 417/I-4 INTERCHANGE MODIFICATION (PROJ. LENGTH 1.949 MI)

PROPOSED BRIDGE TYPICAL SECTION



RAMP HH1 OVER WILSON ROAD

DS = 50 MPH

BRIDGE 24A

APPROVED BY: Engineer of Record Printed Name	FDOT CONCURRENCE	FHWA CONCURRENCE
Ram Kozhikote P.E. 44022 Engineer Of Record — Date	Printed Name FDOT District Design Engineer — Date	Printed Name FHWA Transportation Engineer — Date

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PROJECT IDENTIFICATION

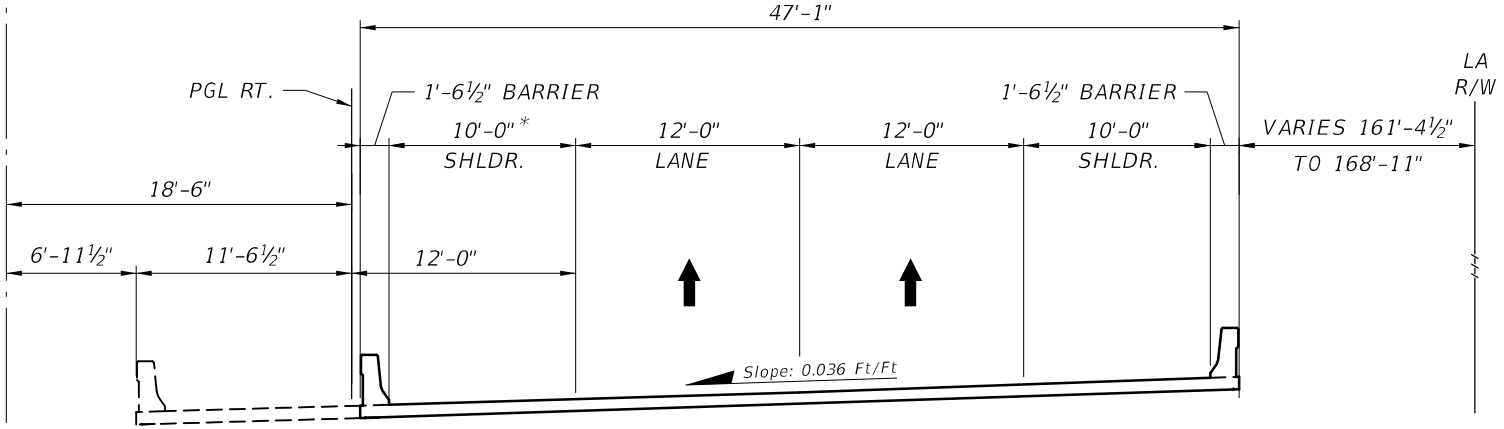
FINANCIAL PROJECT ID 240200-4-52-01 FEDERAL AID PROJECT NO. TBD

COUNTY NAME SEMINOLE ROAD DESIGNATION SR 429 LIMITS/MILEPOST NEW ALIGNMENT

PROJECT DESCRIPTION WEKIVA PARKWAY FROM 0.028 MI EAST OF ORANGE BLVD. TO SR 417/I-4 INTERCHANGE MODIFICATION (PROJ. LENGTH 1.949 MI)

PROPOSED BRIDGE TYPICAL SECTION

℄ SR 429 (WEKIVA PKWY.)



SR 429 (WEKIVA PARKWAY) NB OVER WILSON ROAD

DS = 70 MPH

* REQUIRED FOR SIGHT DISTANCE

BRIDGE 24B

APPROVED BY: Engineer of Record Printed Name	FDOT CONCURRENCE	FHWA CONCURRENCE
Ram Kozhikote P.E. 44022 Engineer Of Record — Date	Printed Name FDOT District Design Engineer — Date	Printed Name FHWA Transportation Engineer — Date

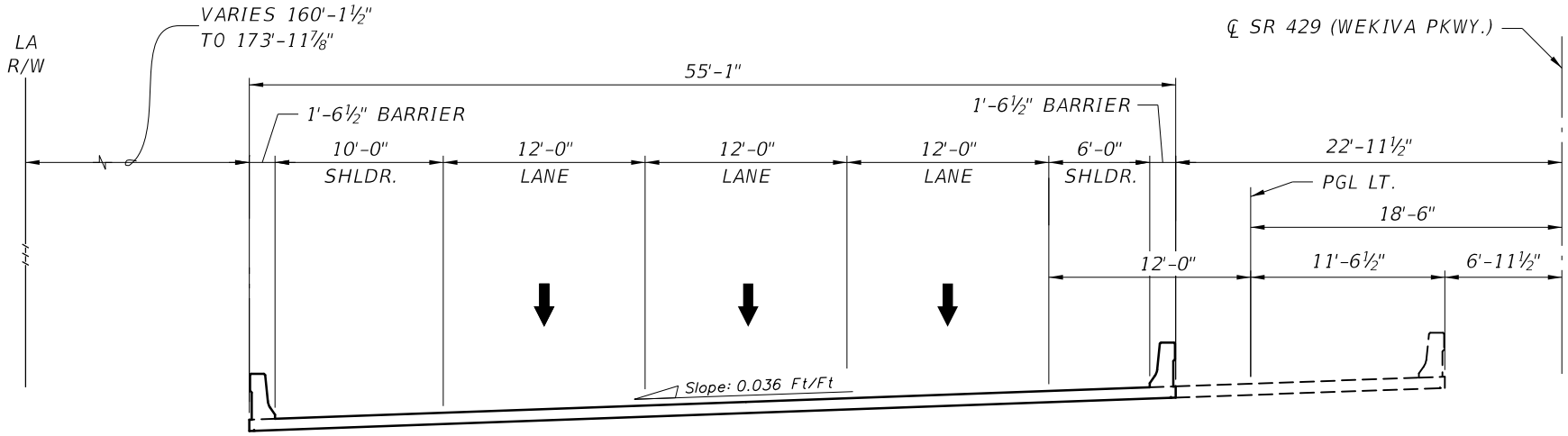
PROJECT IDENTIFICATION

FINANCIAL PROJECT ID 240200-4-52-01 FEDERAL AID PROJECT NO. TBD

COUNTY NAME SEMINOLE ROAD DESIGNATION SR 429 LIMITS/MILEPOST NEW ALIGNMENT

PROJECT DESCRIPTION WEKIVA PARKWAY FROM 0.028 MI EAST OF ORANGE BLVD. TO SR 417/I-4 INTERCHANGE MODIFICATION (PROJ. LENGTH 1.949 MI)

PROPOSED BRIDGE TYPICAL SECTION



SR 429 (WEKIVA PARKWAY) SB OVER WILSON ROAD

DS = 70 MPH

BRIDGE 24C

APPROVED BY: Engineer of Record Printed Name	FDOT CONCURRENCE	FHWA CONCURRENCE
Ram Kozhikote P.E. 44022 Engineer Of Record — Date	Printed Name FDOT District Design Engineer — Date	Printed Name FHWA Transportation Engineer — Date

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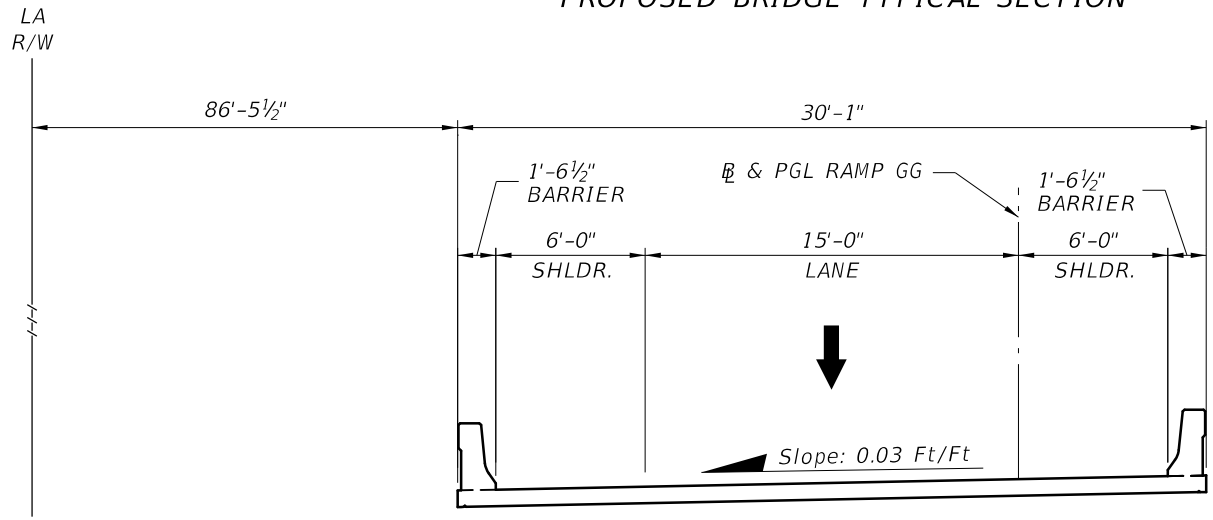
PROJECT IDENTIFICATION

FINANCIAL PROJECT ID 240200-4-52-01 FEDERAL AID PROJECT NO. TBD

COUNTY NAME SEMINOLE ROAD DESIGNATION SR 429 LIMITS/MILEPOST NEW ALIGNMENT

PROJECT DESCRIPTION WEKIVA PARKWAY FROM 0.028 MI EAST OF ORANGE BLVD. TO SR 417/I-4 INTERCHANGE MODIFICATION (PROJ. LENGTH 1.949 MI)

PROPOSED BRIDGE TYPICAL SECTION



RAMP GG OVER WILSON ROAD

DS = 50 MPH

BRIDGE 24D

APPROVED BY: Engineer of Record Printed Name	FDOT CONCURRENCE	FHWA CONCURRENCE
Ram Kozhikote P.E. 44022 Engineer Of Record — Date	Printed Name FDOT District Design Engineer — Date	Printed Name FHWA Transportation Engineer — Date

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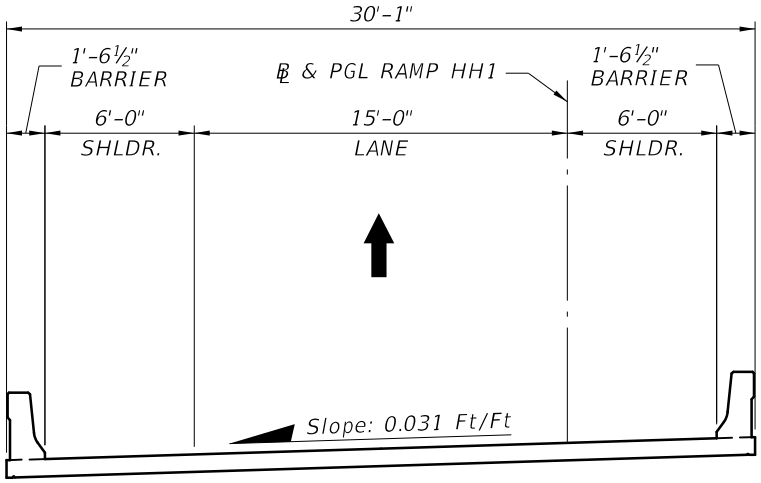
PROJECT IDENTIFICATION

FINANCIAL PROJECT ID 240200-4-52-01 FEDERAL AID PROJECT NO. TBD

COUNTY NAME SEMINOLE ROAD DESIGNATION SR 429 LIMITS/MILEPOST NEW ALIGNMENT

PROJECT DESCRIPTION WEKIVA PARKWAY FROM 0.028 MI EAST OF ORANGE BLVD. TO SR 417/I-4 INTERCHANGE MODIFICATION (PROJ. LENGTH 1.949 MI)

PROPOSED BRIDGE TYPICAL SECTION



RAMP HH1 OVER INTERNATIONAL PARKWAY

DS = 50 MPH

BRIDGE 25A

APPROVED BY: Engineer of Record Printed Name	FDOT CONCURRENCE	FHWA CONCURRENCE
Ram Kozhikote P.E. 44022 Engineer Of Record — Date	Printed Name FDOT District Design Engineer — Date	Printed Name FHWA Transportation Engineer — Date

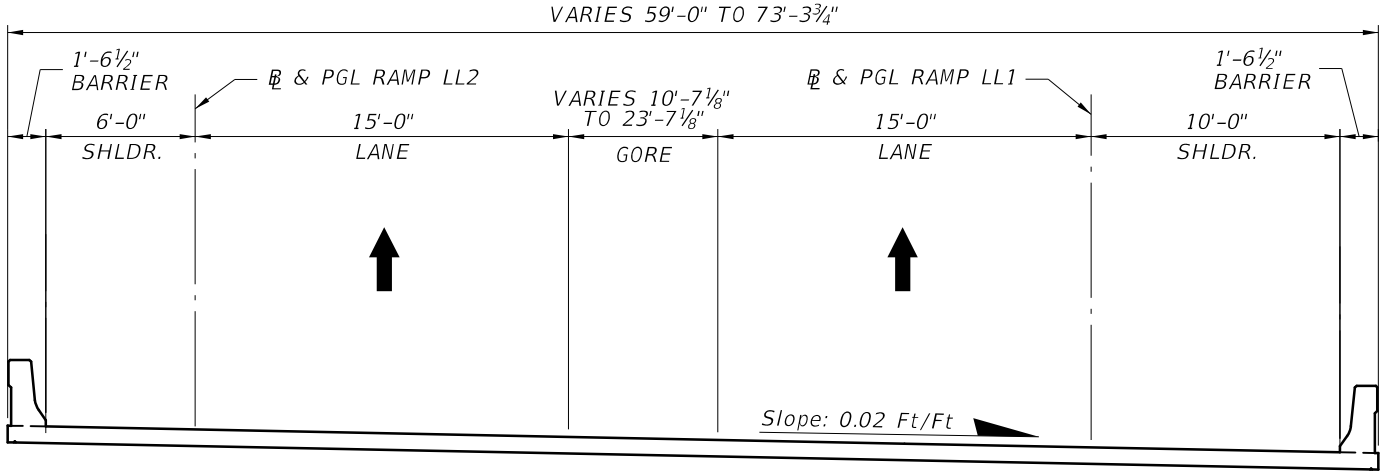
PROJECT IDENTIFICATION

FINANCIAL PROJECT ID 240200-4-52-01 FEDERAL AID PROJECT NO. TBD

COUNTY NAME SEMINOLE ROAD DESIGNATION SR 429 LIMITS/MILEPOST NEW ALIGNMENT

PROJECT DESCRIPTION WEKIVA PARKWAY FROM 0.028 MI EAST OF ORANGE BLVD. TO SR 417/I-4 INTERCHANGE MODIFICATION (PROJ. LENGTH 1.949 MI)

PROPOSED BRIDGE TYPICAL SECTION



RAMPS LL1 & LL2 OVER INTERNATIONAL PARKWAY

DS = 50 MPH

BRIDGE 25B

APPROVED BY: Engineer of Record Printed Name	FDOT CONCURRENCE	FHWA CONCURRENCE
Ram Kozhikote P.E. 44022 Engineer Of Record — Date	Printed Name FDOT District Design Engineer — Date	Printed Name FHWA Transportation Engineer — Date

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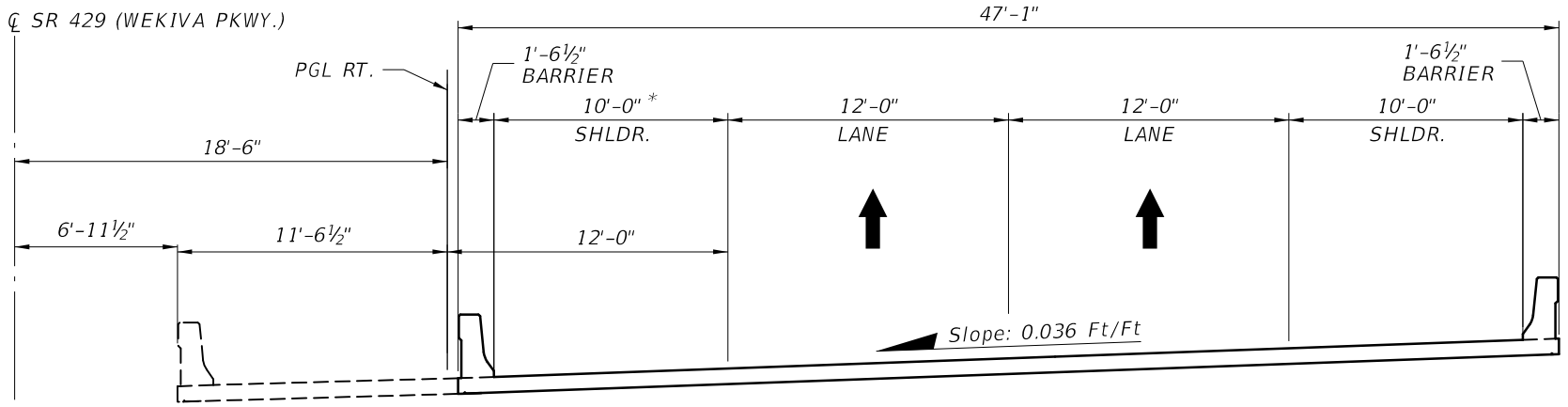
COUNTY NAME SEMINOLE ROAD DESIGNATION SR 429 LIMITS/MILEPOST NEW ALIGNMENT

PROJECT DESCRIPTION WEKIVA PARKWAY FROM 0.028 MI EAST OF ORANGE BLVD. TO SR 417/I-4 INTERCHANGE MODIFICATION (PROJ. LENGTH 1.949 MI)

PROPOSED BRIDGE TYPICAL SECTION



SR 429 (WEKIVA PARKWAY) NB OVER INTERNATIONAL PARKWAY

DS = 70 MPH

* REQUIRED FOR SIGHT DISTANCE

BRIDGE 26A

APPROVED BY: Engineer of Record Printed Name	FDOT CONCURRENCE	FHWA CONCURRENCE
Ram Kozhikote P.E. 44022 Engineer Of Record — Date	Printed Name FDOT District Design Engineer — Date	Printed Name FHWA Transportation Engineer — Date

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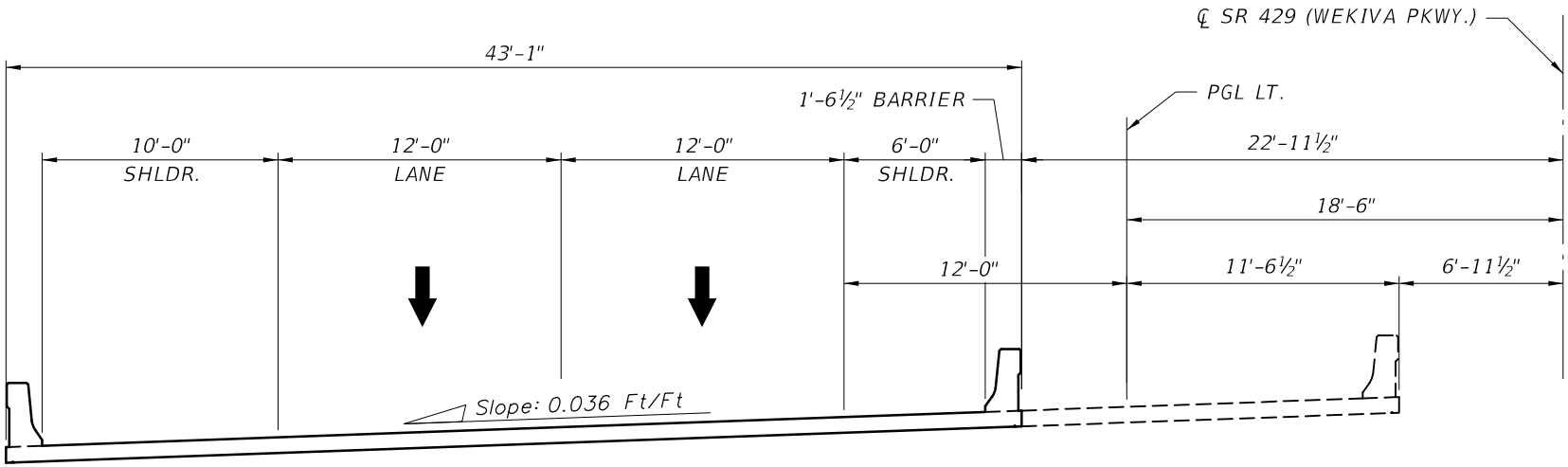
PROJECT IDENTIFICATION

FINANCIAL PROJECT ID 240200-4-52-01 FEDERAL AID PROJECT NO. TBD

COUNTY NAME SEMINOLE ROAD DESIGNATION SR 429 LIMITS/MILEPOST NEW ALIGNMENT

PROJECT DESCRIPTION WEKIVA PARKWAY FROM 0.028 MI EAST OF ORANGE BLVD. TO SR 417/I-4 INTERCHANGE MODIFICATION (PROJ. LENGTH 1.949 MI)

PROPOSED BRIDGE TYPICAL SECTION



SR 429 (WEKIVA PARKWAY) SB OVER INTERNATIONAL PARKWAY

DS = 70 MPH

BRIDGE 26B

APPROVED BY: Engineer of Record Printed Name	FDOT CONCURRENCE	FHWA CONCURRENCE
Ram Kozhikote P.E. 44022 Engineer Of Record — Date	Printed Name FDOT District Design Engineer — Date	Printed Name FHWA Transportation Engineer — Date

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PROJECT IDENTIFICATION

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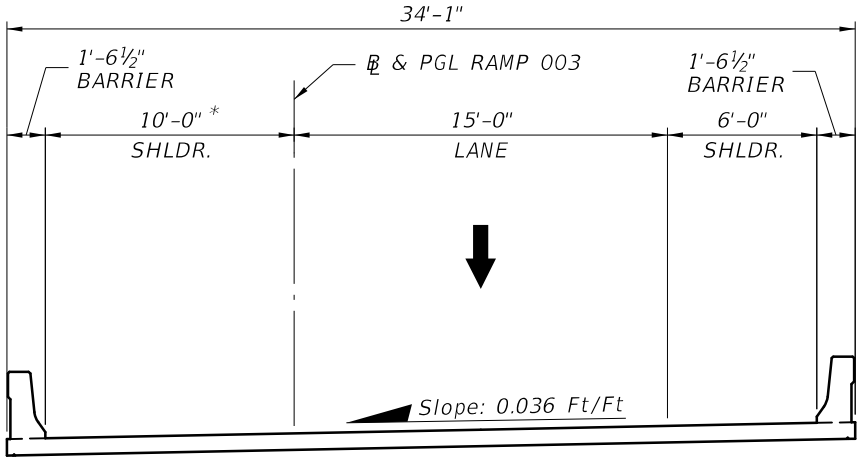
COUNTY NAME SEMINOLE ROAD DESIGNATION SR 429 LIMITS/MILEPOST NEW ALIGNMENT

PROJECT DESCRIPTION WEKIVA PARKWAY FROM 0.028 MI EAST OF ORANGE BLVD. TO SR 417/I-4 INTERCHANGE MODIFICATION (PROJ. LENGTH 1.949 MI)

PROPOSED BRIDGE TYPICAL SECTION



RAMP OO3 OVER INTERNATIONAL PARKWAY

DS = 50 MPH

* REQUIRED FOR SIGHT DISTANCE

BRIDGE 27

APPROVED BY: Engineer of Record Printed Name	FDOT CONCURRENCE	FHWA CONCURRENCE
Ram Kozhikote P.E. 44022 Engineer Of Record — Date	Printed Name FDOT District Design Engineer — Date	Printed Name FHWA Transportation Engineer — Date

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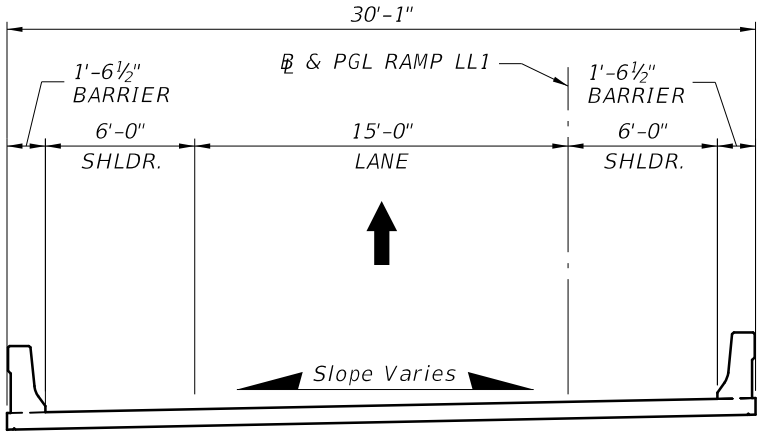
PROJECT IDENTIFICATION

FINANCIAL PROJECT ID 240200-4-52-01 FEDERAL AID PROJECT NO. TBD

COUNTY NAME SEMINOLE ROAD DESIGNATION SR 429 LIMITS/MILEPOST NEW ALIGNMENT

PROJECT DESCRIPTION WEKIVA PARKWAY FROM 0.028 MI EAST OF ORANGE BLVD. TO SR 417/I-4 INTERCHANGE MODIFICATION (PROJ. LENGTH 1.949 MI)

PROPOSED BRIDGE TYPICAL SECTION



RAMP LL1 OVER RAMP LL3 AND EXISTING RAMP

DS = 50 MPH

BRIDGE 28

APPROVED BY: Engineer of Record Printed Name	FDOT CONCURRENCE	FHWA CONCURRENCE
Ram Kozhikote P.E. 44022 Engineer Of Record — Date	Printed Name FDOT District Design Engineer — Date	Printed Name FHWA Transportation Engineer — Date

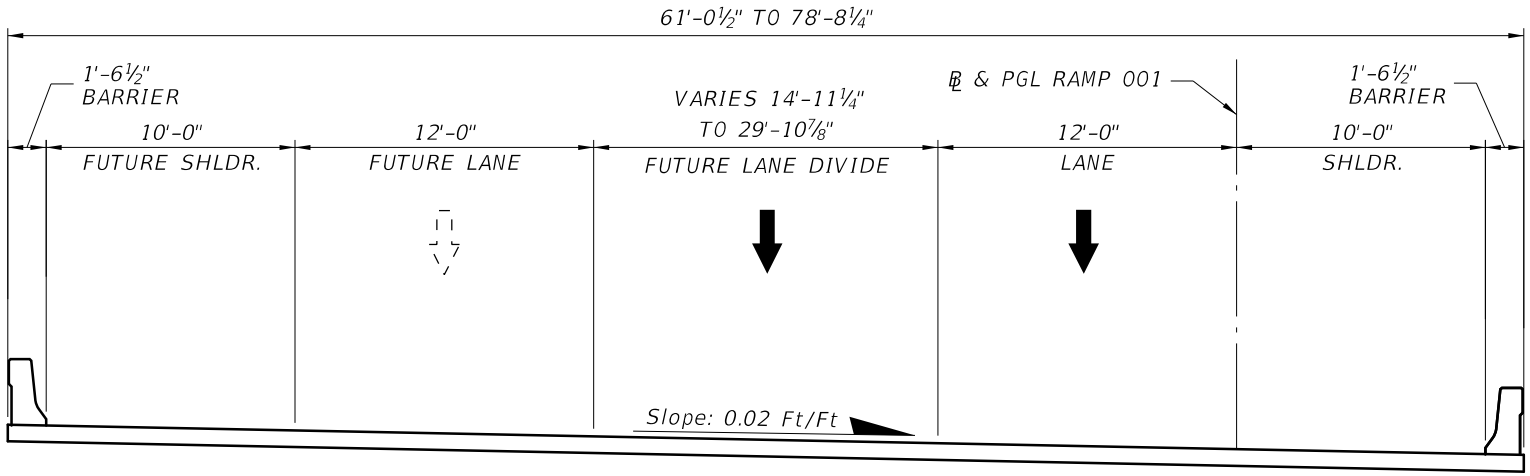
PROJECT IDENTIFICATION

FINANCIAL PROJECT ID 240200-4-52-01 FEDERAL AID PROJECT NO. TBD

COUNTY NAME SEMINOLE ROAD DESIGNATION SR 429 LIMITS/MILEPOST NEW ALIGNMENT

PROJECT DESCRIPTION WEKIVA PARKWAY FROM 0.028 MI EAST OF ORANGE BLVD. TO SR 417/I-4 INTERCHANGE MODIFICATION (PROJ. LENGTH 1.949 MI)

PROPOSED BRIDGE TYPICAL SECTION



RAMP OO1 OVER RAMP LL1

DS = 55 MPH

BRIDGE 29

APPROVED BY: Engineer of Record Printed Name	FDOT CONCURRENCE	FHWA CONCURRENCE
Ram Kozhikote P.E. 44022 Engineer Of Record — Date	Printed Name FDOT District Design Engineer — Date	Printed Name FHWA Transportation Engineer — Date

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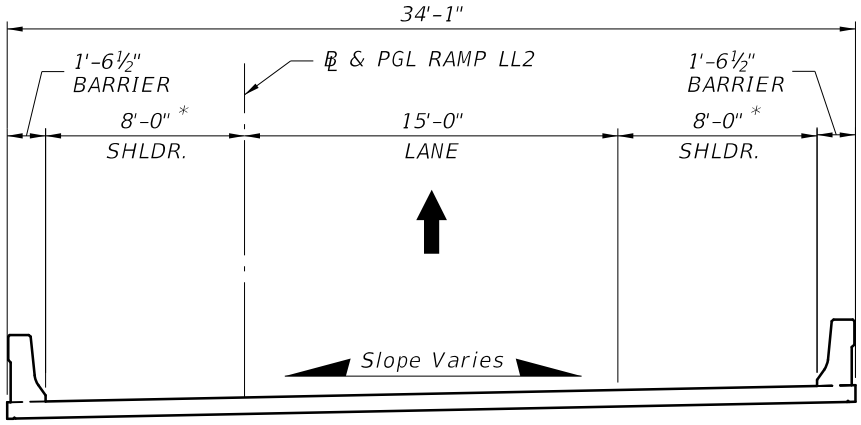
PROJECT IDENTIFICATION

FINANCIAL PROJECT ID 240200-4-52-01 FEDERAL AID PROJECT NO. TBD

COUNTY NAME SEMINOLE ROAD DESIGNATION SR 429 LIMITS/MILEPOST NEW ALIGNMENT

PROJECT DESCRIPTION WEKIVA PARKWAY FROM 0.028 MI EAST OF ORANGE BLVD. TO SR 417/I-4 INTERCHANGE MODIFICATION (PROJ. LENGTH 1.949 MI)

PROPOSED BRIDGE TYPICAL SECTION



RAMP LL2 OVER SR 429 (WEKIVA PARKWAY) MAINLINE

DS = 50 MPH

* REQUIRED FOR SIGHT DISTANCE

BRIDGE 30

APPROVED BY: Engineer of Record Printed Name	FDOT CONCURRENCE	FHWA CONCURRENCE
Ram Kozhikote P.E. 44022 Engineer Of Record — Date	Printed Name FDOT District Design Engineer — Date	Printed Name FHWA Transportation Engineer — Date

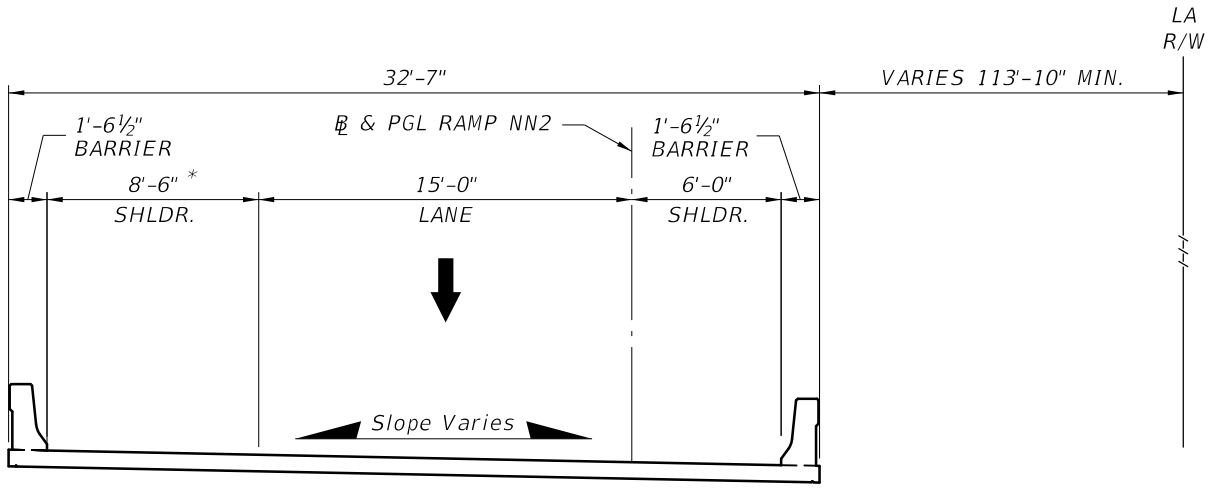
PROJECT IDENTIFICATION

FINANCIAL PROJECT ID 240200-4-52-01 FEDERAL AID PROJECT NO. TBD

COUNTY NAME SEMINOLE ROAD DESIGNATION SR 429 LIMITS/MILEPOST NEW ALIGNMENT

PROJECT DESCRIPTION WEKIVA PARKWAY FROM 0.028 MI EAST OF ORANGE BLVD. TO SR 417/I-4 INTERCHANGE MODIFICATION (PROJ. LENGTH 1.949 MI)

PROPOSED BRIDGE TYPICAL SECTION



RAMP NN2 OVER SR 429 (WEKIVA PARKWAY) MAINLINE

DS = 50 MPH

* REQUIRED FOR SIGHT DISTANCE

BRIDGE 31

APPROVED BY: Engineer of Record Printed Name	FDOT CONCURRENCE	FHWA CONCURRENCE
Ram Kozhikote P.E. 44022 Engineer Of Record — Date	Printed Name FDOT District Design Engineer — Date	Printed Name FHWA Transportation Engineer — Date

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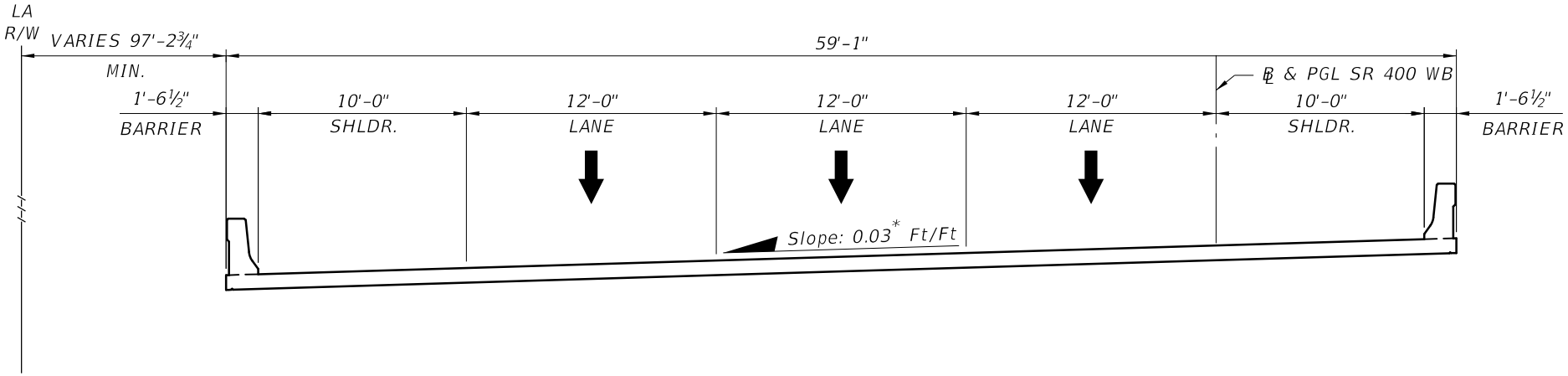
PROJECT IDENTIFICATION

FINANCIAL PROJECT ID 240200-4-52-01 FEDERAL AID PROJECT NO. TBD

COUNTY NAME SEMINOLE ROAD DESIGNATION SR 429 LIMITS/MILEPOST NEW ALIGNMENT

PROJECT DESCRIPTION WEKIVA PARKWAY FROM 0.028 MI EAST OF ORANGE BLVD. TO SR 417/I-4 INTERCHANGE MODIFICATION (PROJ. LENGTH 1.949 MI)

PROPOSED BRIDGE TYPICAL SECTION



SR 400 (I-4) WB OVER SR 429 (WEKIVA PARKWAY) MAINLINE

DS = 70 MPH

* REQUIRED TO AVOID HYDROPLANING

BRIDGE 32A

APPROVED BY: Engineer of Record Printed Name	FDOT CONCURRENCE	FHWA CONCURRENCE
Ram Kozhikote P.E. 44022 Engineer Of Record — Date	Printed Name FDOT District Design Engineer — Date	Printed Name FHWA Transportation Engineer — Date

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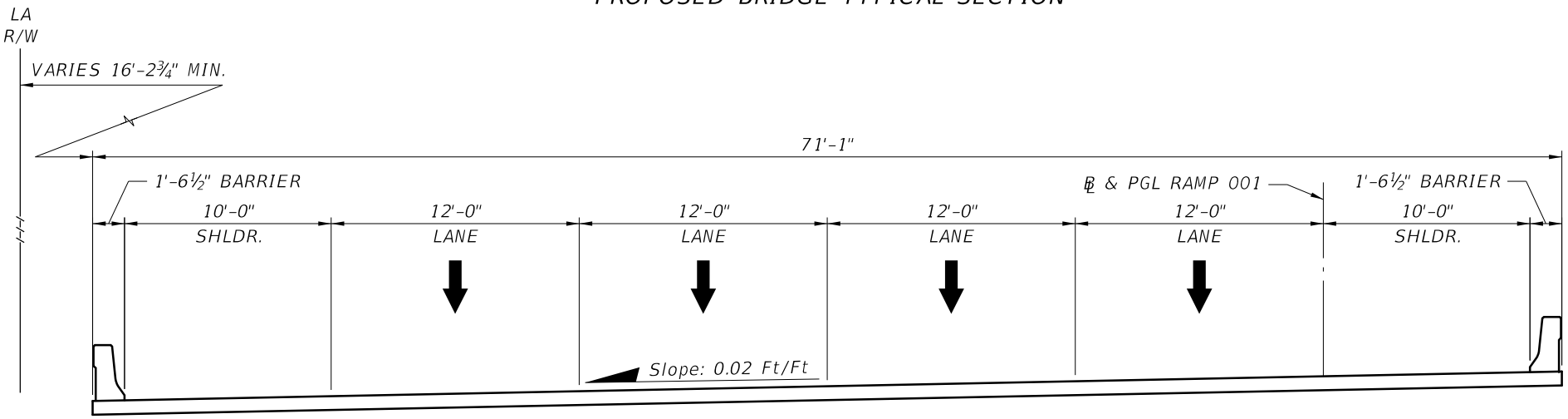
PROJECT IDENTIFICATION

FINANCIAL PROJECT ID 240200-4-52-01 FEDERAL AID PROJECT NO. TBD

COUNTY NAME SEMINOLE ROAD DESIGNATION SR 429 LIMITS/MILEPOST NEW ALIGNMENT

PROJECT DESCRIPTION WEKIVA PARKWAY FROM 0.028 MI EAST OF ORANGE BLVD. TO SR 417/I-4 INTERCHANGE MODIFICATION (PROJ. LENGTH 1.949 MI)

PROPOSED BRIDGE TYPICAL SECTION



RAMP OO1 OVER SR 429 (WEKIVA PARKWAY) MAINLINE

DS = 55 MPH

BRIDGE 32B

APPROVED BY: Engineer of Record Printed Name	FDOT CONCURRENCE	FHWA CONCURRENCE
Ram Kozhikote P.E. 44022 Engineer Of Record — Date	Printed Name FDOT District Design Engineer — Date	Printed Name FHWA Transportation Engineer — Date

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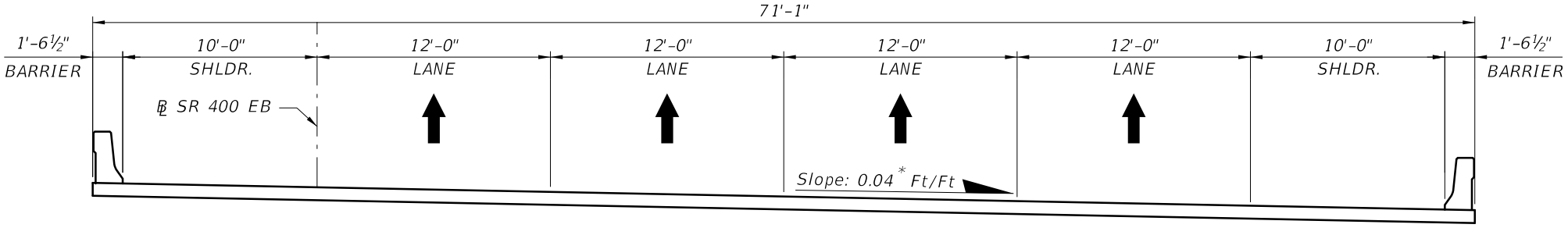
PROJECT IDENTIFICATION

FINANCIAL PROJECT ID 240200-4-52-01 FEDERAL AID PROJECT NO. TBD

COUNTY NAME SEMINOLE ROAD DESIGNATION SR 429 LIMITS/MILEPOST NEW ALIGNMENT

PROJECT DESCRIPTION WEKIVA PARKWAY FROM 0.028 MI EAST OF ORANGE BLVD. TO SR 417/I-4 INTERCHANGE MODIFICATION (PROJ. LENGTH 1.949 MI)

PROPOSED BRIDGE TYPICAL SECTION



SR 400 (I-4) EB OVER SR 429 (WEKIVA PARKWAY) MAINLINE

DS = 70 MPH

* REQUIRED TO AVOID HYDROPLANING

BRIDGE 33A

APPROVED BY: Engineer of Record Printed Name	FDOT CONCURRENCE	FHWA CONCURRENCE
Ram Kozhikote P.E. 44022 Engineer Of Record — Date	Printed Name FDOT District Design Engineer — Date	Printed Name FHWA Transportation Engineer — Date

PROJECT IDENTIFICATION

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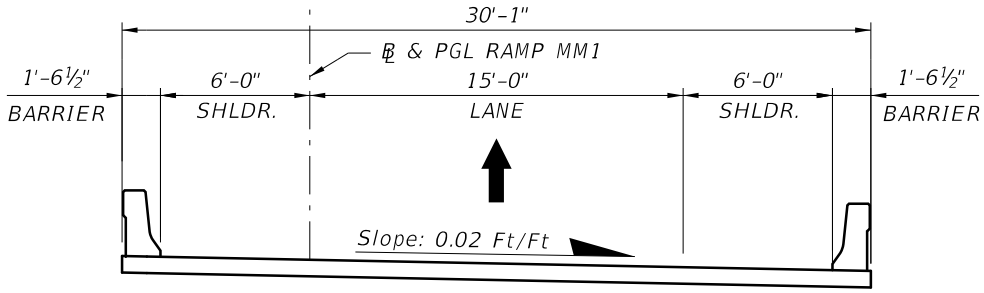
COUNTY NAME SEMINOLE ROAD DESIGNATION SR 429 LIMITS/MILEPOST NEW ALIGNMENT

PROJECT DESCRIPTION WEKIVA PARKWAY FROM 0.028 MI EAST OF ORANGE BLVD. TO SR 417/I-4 INTERCHANGE MODIFICATION (PROJ. LENGTH 1.949 MI)

PROPOSED BRIDGE TYPICAL SECTION



RAMP MM1 OVER SR 429 (WEKIVA PARKWAY) MAINLINE

DS = 50 MPH

BRIDGE 33B

APPROVED BY: Engineer of Record Printed Name	FDOT CONCURRENCE	FHWA CONCURRENCE
Ram Kozhikote P.E. 44022 Engineer Of Record — Date	Printed Name FDOT District Design Engineer — Date	Printed Name FHWA Transportation Engineer — Date

PROJECT IDENTIFICATION

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COUNTY NAME SEMINOLE ROAD DESIGNATION SR 429 LIMITS/MILEPOST NEW ALIGNMENT

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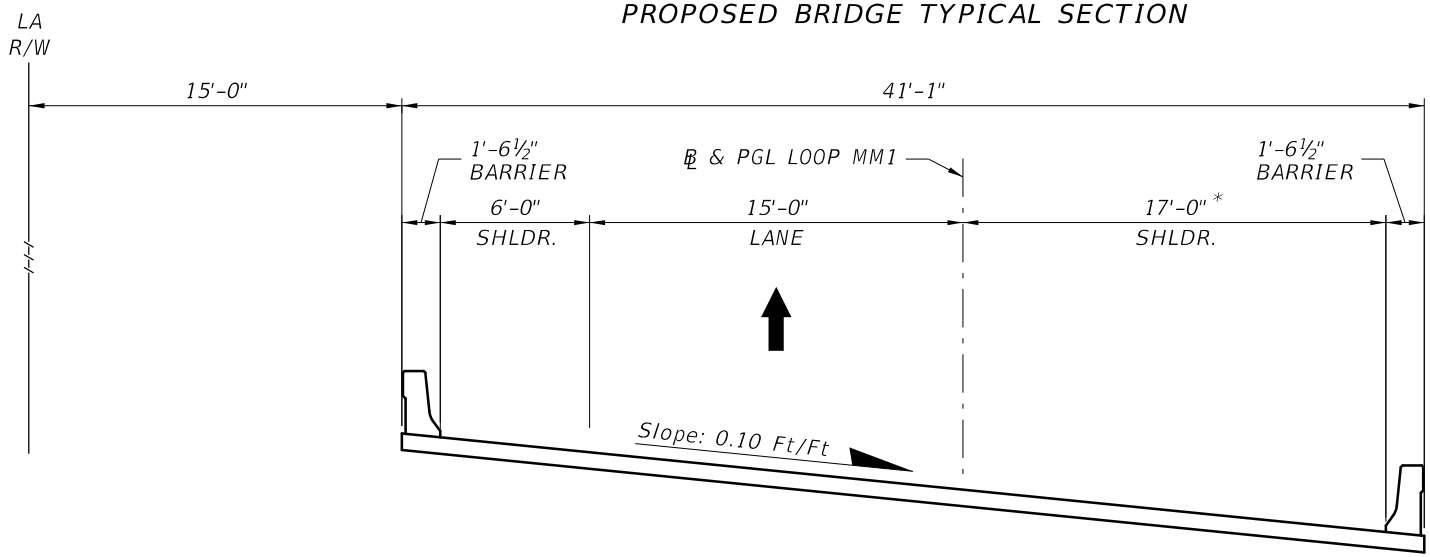
PROPOSED BRIDGE TYPICAL SECTION



RAMP MM1 OVER RAMPS NN1 AND LL2

DS = 35 MPH

* REQUIRED FOR SIGHT DISTANCE

BRIDGE 34

APPROVED BY: Engineer of Record Printed Name	FDOT CONCURRENCE	FHWA CONCURRENCE
Ram Kozhikote P.E. 44022 Engineer Of Record — Date	Printed Name FDOT District Design Engineer — Date	Printed Name FHWA Transportation Engineer — Date

PROJECT IDENTIFICATION

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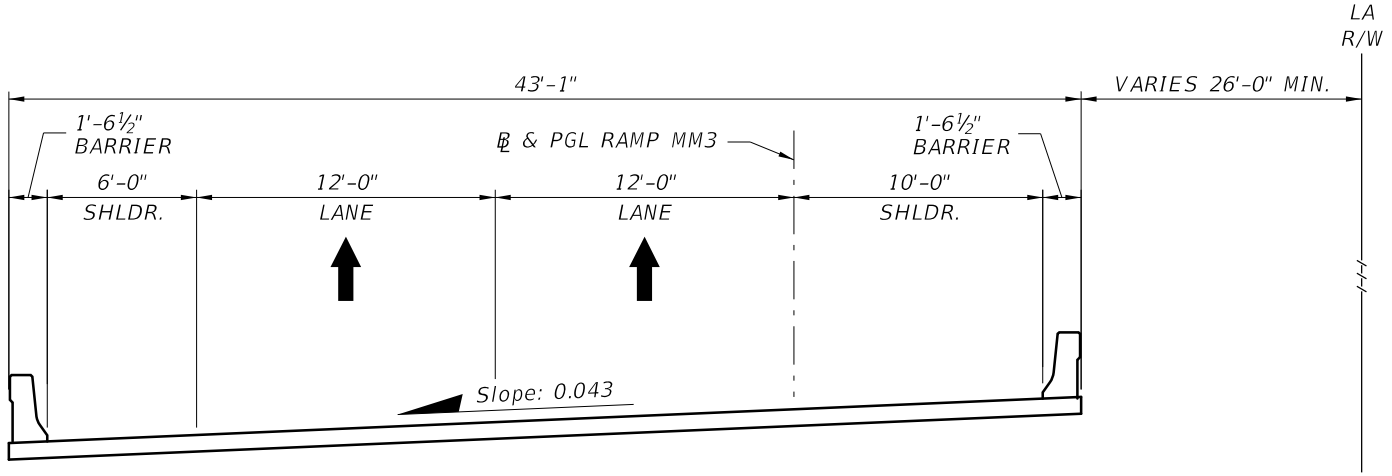
COUNTY NAME SEMINOLE ROAD DESIGNATION SR 429 LIMITS/MILEPOST NEW ALIGNMENT

PROJECT DESCRIPTION WEKIVA PARKWAY FROM 0.028 MI EAST OF ORANGE BLVD. TO SR 417/I-4 INTERCHANGE MODIFICATION (PROJ. LENGTH 1.949 MI)

PROPOSED BRIDGE TYPICAL SECTION



RAMP MM3 OVER RAMP NN1

DS = 50 MPH

BRIDGE 35

APPROVED BY: Engineer of Record Printed Name	FDOT CONCURRENCE	FHWA CONCURRENCE
Ram Kozhikote P.E. 44022 Engineer Of Record — Date	Printed Name FDOT District Design Engineer — Date	Printed Name FHWA Transportation Engineer — Date

PROJECT IDENTIFICATION

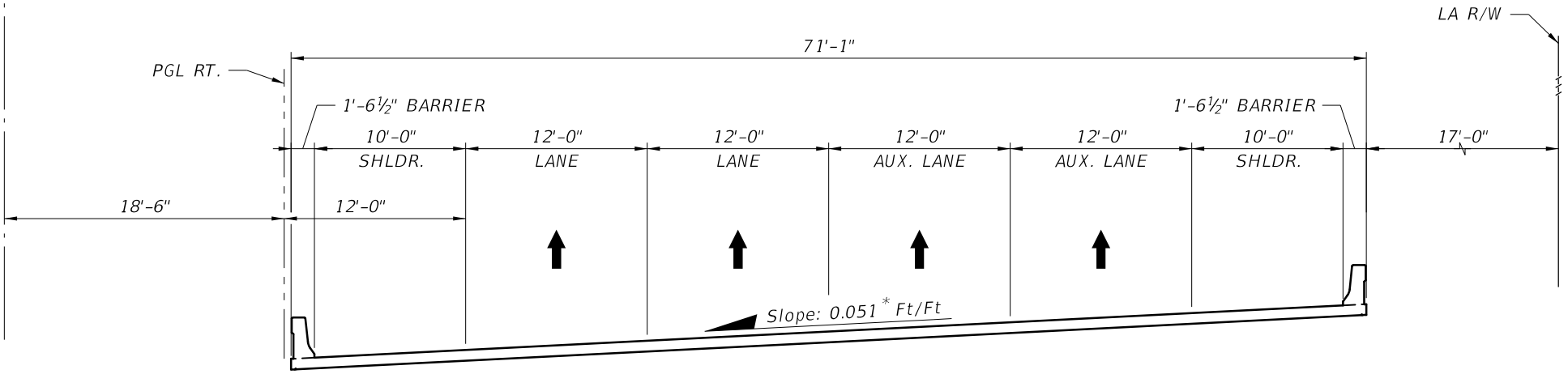
FINANCIAL PROJECT ID 240200-4-52-01 FEDERAL AID PROJECT NO. TBD

COUNTY NAME SEMINOLE ROAD DESIGNATION SR 429 LIMITS/MILEPOST NEW ALIGNMENT

PROJECT DESCRIPTION WEKIVA PARKWAY FROM 0.028 MI EAST OF ORANGE BLVD. TO SR 417/I-4 INTERCHANGE MODIFICATION (PROJ. LENGTH 1.949 MI)

PROPOSED BRIDGE TYPICAL SECTION

℄ SR 429 (WEKIVA PKWY.)



SR 417 SB OVER TOWNE CENTER BLVD.

DS = 70 MPH

* REQUIRED TO AVOID HYDROPLANING

BRIDGE 36A

APPROVED BY: Engineer of Record Printed Name	FDOT CONCURRENCE	FHWA CONCURRENCE
Ram Kozhikote P.E. 44022 Engineer Of Record — Date	Printed Name FDOT District Design Engineer — Date	Printed Name FHWA Transportation Engineer — Date

USER: rank4899 3/28/2016 4:27:51 PM \\fusola1002\TCs\PROJECTS\FDOT_D5\Wekiva Line and Grade\43108143201\struct\36A\B36ATypicalSection.dgn

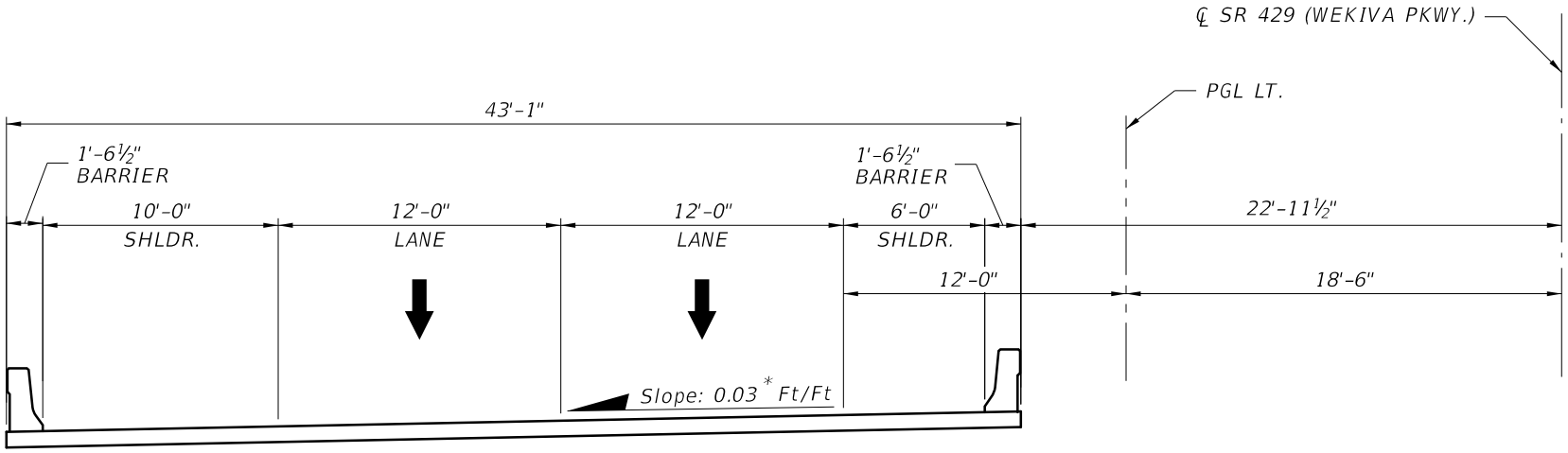
PROJECT IDENTIFICATION

FINANCIAL PROJECT ID 240200-4-52-01 FEDERAL AID PROJECT NO. TBD

COUNTY NAME SEMINOLE ROAD DESIGNATION SR 429 LIMITS/MILEPOST NEW ALIGNMENT

PROJECT DESCRIPTION WEKIVA PARKWAY FROM 0.028 MI EAST OF ORANGE BLVD. TO SR 417/I-4 INTERCHANGE MODIFICATION (PROJ. LENGTH 1.949 MI)

PROPOSED BRIDGE TYPICAL SECTION



SR 417 NB OVER TOWNE CENTER BLVD.

DS = 70 MPH

* REQUIRED TO AVOID HYDROPLANING

BRIDGE 36B

APPROVED BY: Engineer of Record Printed Name	FDOT CONCURRENCE	FHWA CONCURRENCE
Ram Kozhikote P.E. 44022 Engineer Of Record — Date	Printed Name FDOT District Design Engineer — Date	Printed Name FHWA Transportation Engineer — Date

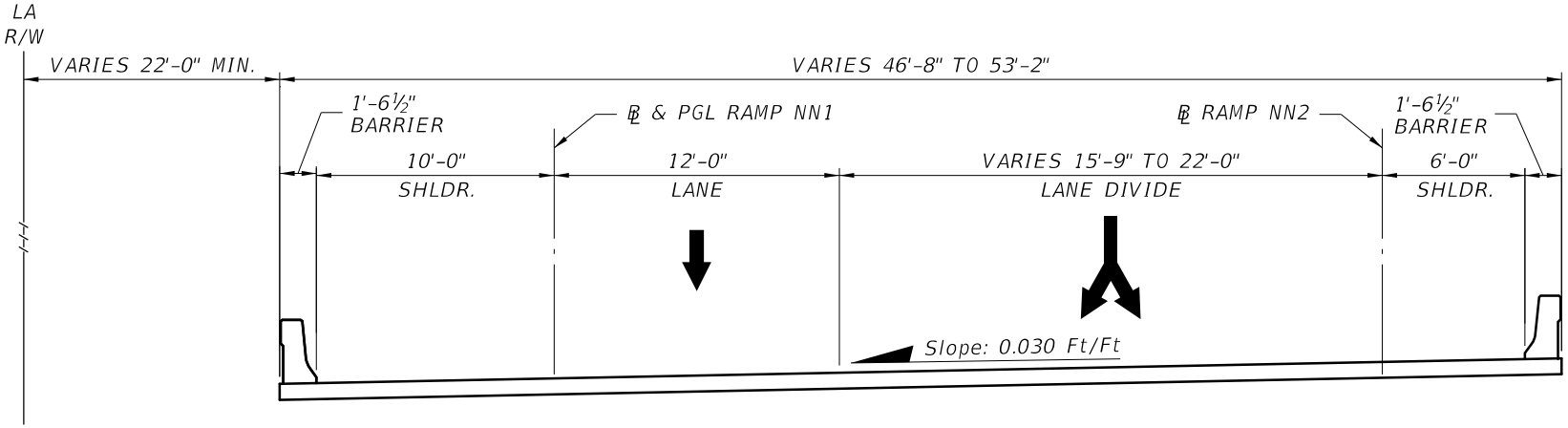
PROJECT IDENTIFICATION

FINANCIAL PROJECT ID 240200-4-52-01 FEDERAL AID PROJECT NO. TBD

COUNTY NAME SEMINOLE ROAD DESIGNATION SR 429 LIMITS/MILEPOST NEW ALIGNMENT

PROJECT DESCRIPTION WEKIVA PARKWAY FROM 0.028 MI EAST OF ORANGE BLVD. TO SR 417/I-4 INTERCHANGE MODIFICATION (PROJ. LENGTH 1.949 MI)

PROPOSED BRIDGE TYPICAL SECTION



RAMPS NN1 AND NN2 OVER TOWNE CENTER BLVD.

DS = 50 MPH

BRIDGE 36C

APPROVED BY: Engineer of Record Printed Name	FDOT CONCURRENCE	FHWA CONCURRENCE
Ram Kozhikote P.E. 44022 Engineer Of Record — Date	Printed Name FDOT District Design Engineer — Date	Printed Name FHWA Transportation Engineer — Date

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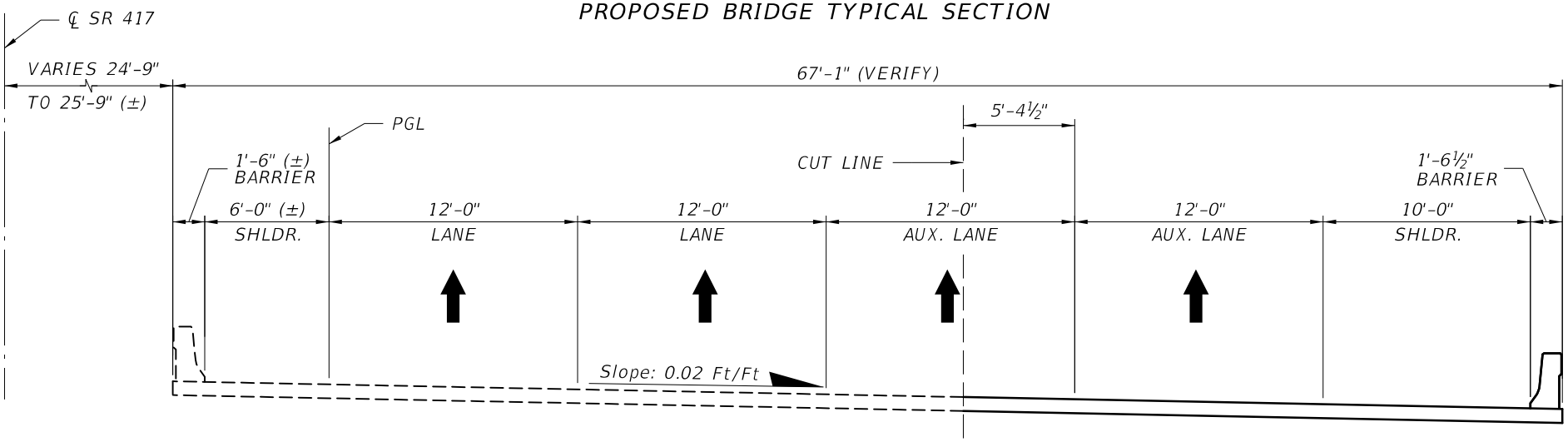
PROJECT IDENTIFICATION

FINANCIAL PROJECT ID 240200-4-52-01 FEDERAL AID PROJECT NO. TBD

COUNTY NAME SEMINOLE ROAD DESIGNATION SR 429 LIMITS/MILEPOST NEW ALIGNMENT

PROJECT DESCRIPTION WEKIVA PARKWAY FROM 0.028 MI EAST OF ORANGE BLVD. TO SR 417/I-4 INTERCHANGE MODIFICATION (PROJ. LENGTH 1.949 MI)

PROPOSED BRIDGE TYPICAL SECTION



SR 417 SB WIDENING OVER RINEHART ROAD

DS = 70 MPH

BRIDGE 37

APPROVED BY: Engineer of Record Printed Name	FDOT CONCURRENCE	FHWA CONCURRENCE
Ram Kozhikote P.E. 44022 Engineer Of Record — Date	Printed Name FDOT District Design Engineer — Date	Printed Name FHWA Transportation Engineer — Date

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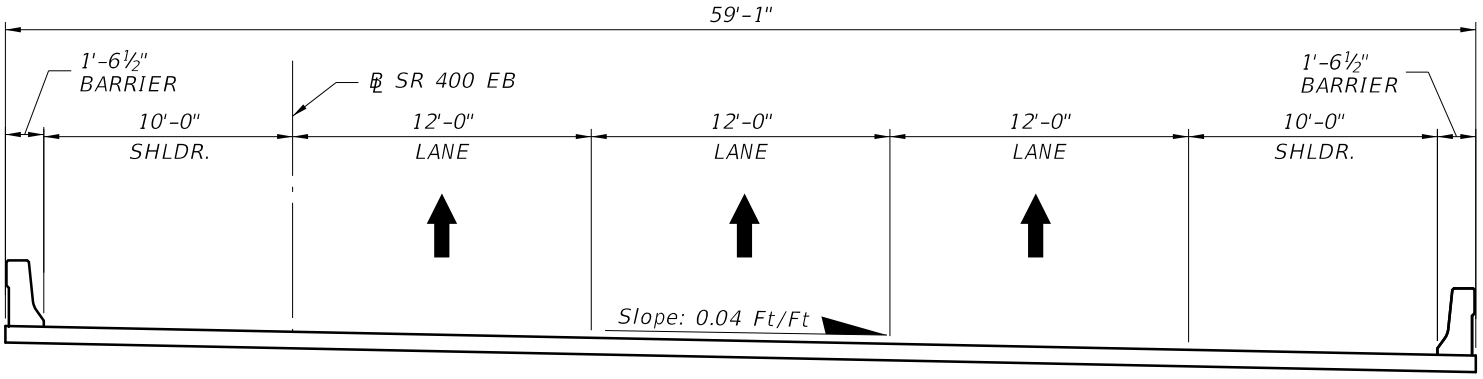
PROJECT IDENTIFICATION

FINANCIAL PROJECT ID 240200-4-52-01 FEDERAL AID PROJECT NO. TBD

COUNTY NAME SEMINOLE ROAD DESIGNATION SR 429 LIMITS/MILEPOST NEW ALIGNMENT

PROJECT DESCRIPTION WEKIVA PARKWAY FROM 0.028 MI EAST OF ORANGE BLVD. TO SR 417/I-4 INTERCHANGE MODIFICATION (PROJ. LENGTH 1.949 MI)

PROPOSED BRIDGE TYPICAL SECTION



SR 400 (I-4) EB OVER RAMP EE4

DS = 70 MPH

BRIDGE 38

APPROVED BY: Engineer of Record Printed Name	FDOT CONCURRENCE	FHWA CONCURRENCE
Ram Kozhikote P.E. 44022 Engineer Of Record — Date	Printed Name FDOT District Design Engineer — Date	Printed Name FHWA Transportation Engineer — Date

Section 3 – Horizontal Geometry

Wekiva Section 8: Chains and Profiles

Alignment	Chain Name	Profile Name	Comments
C/L CONST. SR 429 (WEKIVA PKWY)	429_A1	429_A1	Serves as EB PGL at Begin Project
		429_A1_PGL_WB	WB PGL tying to Project 7A
B/L SURVEY SR 429	BLSV429	-	Also called C/L Const. & C/L Survey
C/L SURVEY SR 417	BLSV417	-	Also called C/L Const. & C/L Survey
C/L SURVEY SR 400 (I-4)	BLSV400	-	
B/L SR 400 EB	SR400EB	SR400EB	
B/L SR 400 EB (ULTIMATE) CR46A	ULT400EB1	-	
B/L SR 400 EB (ULTIMATE) SR46	ULT400EB2	-	
B/L SR 400 WB	SR400WB	SR400WB	
B/L SR 400 WB (ULTIMATE) CR46A	ULT400WB1	-	
B/L SR 400 WB (ULTIMATE) SR46	ULT400WB2	-	
C/L SR 400 EXPRESS LANES (ULTIMATE)	CLI4	CLI4	
C/L WILSON ROAD	WILSON	-	
C/L INTERNATIONAL PKWY	INPK_A1	-	
C/L TOWN CENTER BLVD	TOWNCTR	-	
C/L RINEHART RD	RINHT	-	
C/L METZ AVE	METZ	-	
B/L RAMP EE2 (ULTIMATE)	EE2	EE2	Express lane ramps
B/L RAMP EE3 (ULTIMATE)	EE3	EE3	Express lane ramps
B/L RAMP EE4 (ULTIMATE)	EE4	EE4	Express lane ramps
B/L RAMP EE5 (ULTIMATE)	EE5	EE5	Express lane ramps
B/L RAMP GG	GG	GG	
B/L RAMP HH1	HH1	HH1	
B/L RAMP HH2	HH2	HH2	
B/L RAMP LL1	LL1	LL1	
B/L RAMP LL1 (ULTIMATE)	ULT-LL1	-	
B/L RAMP LL2	LL2	LL2	
B/L RAMP LL3	LL3	LL3	
B/L RAMP MM1	MM1	MM1	
B/L RAMP MM2	MM2	MM2	
B/L RAMP MM3	MM3	MM3	
B/L RAMP NN1	NN1	NN1	
B/L RAMP NN2	NN2	NN2	
B/L RAMP 001	001	001	
B/L RAMP 001 (ULTIMATE)	ULT-001	-	
B/L RAMP 002	002	002	
B/L RAMP 003	003	003	
B/L RAMP 004	004	004	
B/L RAMP RR	RR	RR	
B/L RAMP CR46A EB	CR46AEB	CR46AEB	

Project: Wekiva Section 8
Job No. 429
Operator: RD
Date: Friday March 25, 2016

Chain 429_A1 contains:
CUR 429_A1-1 1 CUR 429_A1-2 CUR 429_A1-3 CUR 429_A1-4 2 CUR 429_A1-5 42903 CUR - 429_A1-6

Beginning chain 429_A1 description
==========

		Curve Data				

Curve 429_A1-1						
P.I. Station		1085+23.6090	N	1,628,509.07	E	538,122.03
Delta	=	49° 37' 29.79" (RT)				
Degree	=	0° 52' 00.00"				
Tangent	=	3,056.48				
Length	=	5,725.95				
Radius	=	6,611.05				
External	=	672.36				
Long Chord	=	5,548.65				
Mid. Ord.	=	610.29				
P.C. Station		1054+67.1280	N	1,628,477.59	E	535,065.71
P.T. Station		1111+93.0828	N	1,626,201.09	E	540,125.86
C.C.			N	1,621,866.89	E	535,133.79
Back	= N	89° 24' 35.99" E				
Ahead	= S	40° 57' 54.22" E				
Chord Bear	= S	65° 46' 39.12" E				

Course from PT 429_A1-1 to 1 S 40° 57' 54.22" E Dist 263.09

Equation: Sta 1114+56.1750 (BK) = Sta 1114+87.2500 (AH)

End Region 1
Begin Region 2

Point 1 N 1,626,002.43 E 540,298.34 Sta 1114+87.2500

Course from 1 to PC 429_A1-2 S 40° 57' 54.22" E Dist 2,007.83

		Curve Data				

Curve 429_A1-2						
P.I. Station		1157+43.0569	N	1,622,788.83	E	543,088.44
Delta	=	41° 23' 16.70" (LT)				
Degree	=	0° 57' 46.05"				
Tangent	=	2,247.98				
Length	=	4,298.74				
Radius	=	5,951.00				
External	=	410.43				
Long Chord	=	4,205.89				
Mid. Ord.	=	383.95				
P.C. Station		1134+95.0751	N	1,624,486.30	E	541,614.67
P.T. Station		1177+93.8180	N	1,622,489.69	E	545,316.43
C.C.			N	1,628,387.77	E	546,108.32
Back	= S	40° 57' 54.22" E				
Ahead	= S	82° 21' 10.92" E				
Chord Bear	= S	61° 39' 32.57" E				

		Curve Data				

Curve 429_A1-3						
P.I. Station		1183+68.1964	N	1,622,413.26	E	545,885.70
Delta	=	7° 48' 00.95" (LT)				
Degree	=	0° 40' 48.25"				
Tangent	=	574.38				
Length	=	1,146.98				
Radius	=	8,425.00				
External	=	19.56				
Long Chord	=	1,146.10				

```
Mid. Ord.   =              19.51
P.C.  Station        1177+93.8180  N        1,622,489.69  E          545,316.43
P.T.  Station        1189+40.8000  N        1,622,414.79  E          546,460.08
C.C.                               N        1,630,839.76  E          546,437.54
Back        = S  82° 21' 10.92" E
Ahead       = N  89° 50' 48.12" E
Chord Bear  = S  86° 15' 11.40" E

                                Curve Data
                               *----------*
Curve 429_A1-4
P.I.  Station        1203+68.7592  N        1,622,418.62  E          547,888.03
Delta       =      14° 51' 10.82" (LT)
Degree      =       0° 31' 22.84"
Tangent     =            1,427.96
Length      =            2,839.91
Radius      =           10,955.00
External    =               92.67
Long Chord  =            2,831.96
Mid. Ord.   =               91.90
P.C.  Station        1189+40.8000  N        1,622,414.79  E          546,460.08
P.T.  Station        1217+80.7067  N        1,622,788.35  E          549,267.29
C.C.                               N        1,633,369.76  E          546,430.77
Back        = N  89° 50' 48.12" E
Ahead       = N  74° 59' 37.31" E
Chord Bear  = N  82° 25' 12.72" E

                                                              End   Region 2
Equation: Sta 1217+80.7067 (BK) = Sta 2169+83.9579 (AH)       ----------------
                                                              Begin Region 3

Point 2              N     1,622,788.35 E       549,267.29 Sta  2169+83.9579

Course from 2 to PC 429_A1-5 N 74° 59' 37.31" E Dist 1,016.91

                                Curve Data
                               *----------*
Curve 429_A1-5
P.I.  Station        2185+87.6600  N        1,623,203.59  E          550,816.31
Delta       =      11° 41' 32.92" (RT)
Degree      =       0° 59' 59.19"
Tangent     =              586.79
Length      =            1,169.51
Radius      =            5,730.86
External    =               29.96
Long Chord  =            1,167.48
Mid. Ord.   =               29.81
P.C.  Station        2180+00.8671  N        1,623,051.65  E          550,249.52
P.T.  Station        2191+70.3773  N        1,623,237.51  E          551,402.12
C.C.                               N        1,617,516.23  E          551,733.39
Back        = N  74° 59' 37.31" E
Ahead       = N  86° 41' 10.23" E
Chord Bear  = N  80° 50' 23.77" E

Course from PT 429_A1-5 to 42903 N 86° 41' 10.23" E Dist 569.11

Point 42903          N     1,623,270.41 E       551,970.28 Sta  2197+39.4900

Course from 42903 to PC 429_A1-6 N 86° 41' 10.10" E Dist 525.79

                                Curve Data
                               *----------*
Curve 429_A1-6
P.I.  Station        2207+73.3078  N        1,623,330.17  E          553,002.37
Delta       =       5° 04' 37.00" (LT)
Degree      =       0° 30' 00.00"
Tangent     =              508.03
Length      =            1,015.39
Radius      =           11,459.16
External    =               11.26
Long Chord  =            1,015.06
```

```
Mid. Ord.   =              11.24
P.C.  Station        2202+65.2807  N        1,623,300.80  E          552,495.19
P.T.  Station        2212+80.6700  N        1,623,404.30  E          553,504.96
C.C.                               N        1,634,740.80  E          551,832.79
Back        = N  86° 41' 10.10" E
Ahead       = N  81° 36' 33.10" E
Chord Bear  = N  84° 08' 51.60" E

================================================================================
Ending chain 429_A1 description


<*       2   Describe Chain BLSV429

Chain BLSV429 contains:
 BS1000 CUR BLSV429-1 CUR BLSV429-2

Beginning chain BLSV429 description
================================================================================

Point BS1000          N     1,624,486.30 E       541,614.67 Sta  1134+95.0751

Course from BS1000 to PC BLSV429-1 S 40° 57' 54.22" E Dist 68.68

                                Curve Data
                               *----------*
Curve BLSV429-1
P.I.  Station        1154+88.1694  N        1,622,981.29  E          542,921.34
Delta       =      37° 07' 53.76" (LT)
Degree      =       1° 00' 00.00"
Tangent     =            1,924.41
Length      =            3,713.16
Radius      =            5,729.58
External    =              314.54
Long Chord  =            3,648.52
Mid. Ord.   =              298.18
P.C.  Station        1135+63.7599  N        1,624,434.43  E          541,659.70
P.T.  Station        1172+76.9199  N        1,622,584.36  E          544,804.37
C.C.                               N        1,628,190.74  E          545,986.16
Back        = S  40° 57' 54.22" E
Ahead       = S  78° 05' 47.98" E
Chord Bear  = S  59° 31' 51.10" E

                                Curve Data
                               *----------*
Curve BLSV429-2
P.I.  Station        1183+81.9106  N        1,622,356.45  E          545,885.60
Delta       =      16° 27' 38.51" (LT)
Degree      =       0° 45' 00.00"
Tangent     =            1,104.99
Length      =            2,194.76
Radius      =            7,639.44
External    =               79.50
Long Chord  =            2,187.22
Mid. Ord.   =               78.68
P.C.  Station        1172+76.9199  N        1,622,584.36  E          544,804.37
P.T.  Station        1194+71.6797  N        1,622,444.25  E          546,987.09
C.C.                               N        1,630,059.53  E          546,380.09
Back        = S  78° 05' 47.98" E
Ahead       = N  85° 26' 33.50" E
Chord Bear  = S  86° 19' 37.24" E

================================================================================
Ending chain BLSV429 description


<*       3   Describe Chain BLSV417

Chain BLSV417 contains:
 BS2000 CUR BLSV417-1 BS2001
```

```
Beginning chain BLSV417 description
================================================================================

Point BS2000          N     1,622,334.32 E       545,487.30 Sta  2201+68.9647

Course from BS2000 to PC BLSV417-1 N 85° 40' 12.00" E Dist 2,202.07

                                Curve Data
                               *----------*
Curve BLSV417-1
P.I.  Station        2230+84.8230  N        1,622,554.47  E          548,394.83
Delta       =      10° 40' 34.69" (LT)
Degree      =       0° 45' 00.12"
Tangent     =             713.79
Length      =           1,423.44
Radius      =           7,639.09
External    =              33.28
Long Chord  =           1,421.38
Mid. Ord.   =              33.13
P.C.  Station        2223+71.0350  N        1,622,500.58  E          547,683.08
P.T.  Station        2237+94.4779  N        1,622,739.29  E          549,084.28
C.C.                               N        1,630,117.87  E          547,106.32
Back        = N  85° 40' 12.00" E
Ahead       = N  74° 59' 37.31" E
Chord Bear  = N  80° 19' 54.65" E

Course from PT BLSV417-1 to BS2001 N 74° 59' 37.31" E Dist 189.48

Point BS2001          N     1,622,788.35 E       549,267.29 Sta  2239+83.9579

================================================================================
Ending chain BLSV417 description


<*       4   Describe Chain BLSV400

Chain BLSV400 contains:
 BS3000 BS3001 BS3002

Beginning chain BLSV400 description
================================================================================

Point BS3000          N     1,617,318.74 E       543,247.86 Sta  2761+17.5730

Course from BS3000 to BS3001 N 24° 03' 38.00" E Dist 8,944.93

Point BS3001          N     1,625,486.49 E       546,894.73 Sta  2850+62.5058

Course from BS3001 to BS3002 N 24° 03' 08.40" E Dist 6,089.35

Point BS3002          N     1,631,047.12 E       549,376.57 Sta  2911+51.8531

================================================================================
Ending chain BLSV400 description


<*       5   Describe Chain SR400EB

Chain SR400EB contains:
 EB1000 CUR SR400EB-1 CUR SR400EB-2 EB1001 CUR SR400EB-3 CUR SR400EB-4 EB1002 E-
B1003 EB1004 CUR SR400EB-5 CUR SR400EB-6 CUR SR400EB-7 EB1005

Beginning chain SR400EB description
================================================================================

Point EB1000          N     1,616,663.60 E       542,988.55 Sta  1013+24.6284

Course from EB1000 to PC SR400EB-1 N 24° 03' 02.04" E Dist 1,245.14

                                Curve Data
                               *----------*
```

```
Curve SR400EB-1
P.I.  Station        1028+21.0291  N        1,618,030.09  E          543,598.39
Delta       =       1° 57' 23.76" (LT)
Degree      =       0° 23' 21.83"
Tangent     =              251.26
Length      =              502.47
Radius      =           14,714.00
External    =                2.15
Long Chord  =              502.45
Mid. Ord.   =                2.14
P.C.  Station        1025+69.7696  N        1,617,800.65  E          543,496.00
P.T.  Station        1030+72.2397  N        1,618,262.90  E          543,692.90
C.C.                               N        1,623,797.23  E          530,059.37
Back        = N  24° 03' 02.04" E
Ahead       = N  22° 05' 38.28" E
Chord Bear  = N  23° 04' 20.16" E

                                Curve Data
                               *-----------*
Curve SR400EB-2
P.I.  Station        1033+25.2932  N        1,618,497.37  E          543,788.08
Delta       =       1° 57' 52.86" (RT)
Degree      =       0° 23' 17.64"
Tangent     =              253.05
Length      =              506.06
Radius      =           14,758.08
External    =                2.17
Long Chord  =              506.03
Mid. Ord.   =                2.17
P.C.  Station        1030+72.2397  N        1,618,262.90  E          543,692.90
P.T.  Station        1035+78.2970  N        1,618,728.44  E          543,891.24
C.C.                               N        1,612,711.99  E          557,367.27
Back        = N  22° 05' 38.28" E
Ahead       = N  24° 03' 31.14" E
Chord Bear  = N  23° 04' 34.71" E

Course from PT SR400EB-2 to EB1001 N 24° 03' 31.14" E Dist 1,576.78

Point EB1001          N     1,620,168.25 E       544,534.05 Sta  1051+55.0778

Course from EB1001 to PC SR400EB-3 N 24° 00' 37.86" E Dist 987.20

                                Curve Data
                               *-----------*
Curve SR400EB-3
P.I.  Station        1063+93.4052  N        1,621,299.42  E          545,037.93
Delta       =       1° 15' 13.13" (RT)
Degree      =       0° 14' 58.60"
Tangent     =              251.13
Length      =              502.24
Radius      =           22,954.00
External    =                1.37
Long Chord  =              502.23
Mid. Ord.   =                1.37
P.C.  Station        1061+42.2755  N        1,621,070.02  E          544,935.75
P.T.  Station        1066+44.5149  N        1,621,526.53  E          545,145.11
C.C.                               N        1,611,729.94  E          565,903.55
Back        = N  24° 00' 37.86" E
Ahead       = N  25° 15' 50.99" E
Chord Bear  = N  24° 38' 14.42" E

                                Curve Data
                               *-----------*
Curve SR400EB-4
P.I.  Station        1069+00.7534  N        1,621,758.26  E          545,254.47
Delta       =       1° 16' 34.92" (LT)
Degree      =       0° 14' 56.65"
Tangent     =              256.24
Length      =              512.46
Radius      =           23,004.00
External    =                1.43
```

```
Long Chord  =              512.45
Mid. Ord.   =                1.43
P.C.  Station        1066+44.5149  N        1,621,526.53  E          545,145.11
P.T.  Station        1071+56.9706  N        1,621,992.37  E          545,358.64
C.C.                               N        1,631,344.46  E          524,341.45
Back        = N  25° 15' 50.99" E
Ahead       = N  23° 59' 16.07" E
Chord Bear  = N  24° 37' 33.53" E

Course from PT SR400EB-4 to EB1004 N 23° 59' 16.07" E Dist 1,318.55

Point EB1004          N     1,623,197.04 E       545,894.69 Sta  1084+75.5212

Course from EB1004 to PC SR400EB-5 N 24° 06' 10.29" E Dist 918.27

                                Curve Data
                               *----------*
Curve SR400EB-5
P.I.  Station        1098+16.3310  N        1,624,420.95  E          546,442.25
Delta       =       1° 56' 11.80" (RT)
Degree      =       0° 13' 45.06"
Tangent     =              422.54
Length      =              845.01
Radius      =           25,000.00
External    =                3.57
Long Chord  =              844.97
Mid. Ord.   =                3.57
P.C.  Station        1093+93.7878  N        1,624,035.25  E          546,269.69
P.T.  Station        1102+38.7938  N        1,624,800.60  E          546,627.74
C.C.                               N        1,613,825.85  E          569,090.03
Back        = N  24° 06' 10.29" E
Ahead       = N  26° 02' 22.09" E
Chord Bear  = N  25° 04' 16.19" E

                                Curve Data
                               *----------*
Curve SR400EB-6
P.I.  Station        1108+89.4340  N        1,625,385.20  E          546,913.36
Delta       =       1° 29' 27.86" (LT)
Degree      =       0° 06' 52.53"
Tangent     =              650.64
Length      =            1,301.21
Radius      =           50,000.00
External    =                4.23
Long Chord  =            1,301.17
Mid. Ord.   =                4.23
P.C.  Station        1102+38.7938  N        1,624,800.60  E          546,627.74
P.T.  Station        1115+40.0007  N        1,625,977.02  E          547,183.68
C.C.                               N        1,646,750.11  E          501,703.15
Back        = N  26° 02' 22.09" E
Ahead       = N  24° 32' 54.23" E
Chord Bear  = N  25° 17' 38.16" E

Course from PT SR400EB-6 to PC SR400EB-7 N 24° 32' 54.23" E Dist 876.37

                                Curve Data
                               *----------*
Curve SR400EB-7
P.I.  Station        1126+07.5784  N        1,626,948.10  E          547,627.22
Delta       =       0° 42' 29.02" (LT)
Degree      =       0° 11' 06.55"
Tangent     =              191.21
Length      =              382.42
Radius      =           30,945.00
External    =                0.59
Long Chord  =              382.42
Mid. Ord.   =                0.59
P.C.  Station        1124+16.3666  N        1,626,774.18  E          547,547.78
P.T.  Station        1127+98.7853  N        1,627,123.00  E          547,704.50
C.C.                               N        1,639,630.64  E          519,399.87
Back        = N  24° 32' 54.23" E
```

```
Ahead       = N  23° 50' 25.20" E
Chord Bear  = N  24° 11' 39.72" E

Course from PT SR400EB-7 to EB1005 N 23° 29' 01.80" E Dist 783.07

Point EB1005          N     1,627,841.21 E       548,016.55 Sta  1135+81.8536

================================================================================
Ending chain SR400EB description


<*       6   Describe Chain ULT400EB1

Chain ULT400EB1 contains:
 UE400 CUR ULT400EB1-1 CUR ULT400EB1-2 UE401

Beginning chain ULT400EB1 description
================================================================================

Point UE400           N     1,615,437.99 E       542,485.38 Sta   999+99.8200

Course from UE400 to PC ULT400EB1-1 N 23° 47' 50.42" E Dist 747.95

                                Curve Data
                               *----------*
Curve ULT400EB1-1
P.I.  Station        1012+42.3526  N        1,616,574.88  E          542,986.75
Delta       =       1° 44' 34.64" (LT)
Degree      =       0° 10' 34.39"
Tangent     =              494.58
Length      =              989.09
Radius      =           32,514.00
External    =                3.76
Long Chord  =              989.05
Mid. Ord.   =                3.76
P.C.  Station        1007+47.7717  N        1,616,122.35  E          542,787.18
P.T.  Station        1017+36.8571  N        1,617,033.27  E          543,172.46
C.C.                               N        1,629,241.84  E          513,037.57
Back        = N  23° 47' 50.42" E
Ahead       = N  22° 03' 15.78" E
Chord Bear  = N  22° 55' 33.10" E

Course from PT ULT400EB1-1 to PC ULT400EB1-2 N 22° 03' 15.78" E Dist 467.92

                                Curve Data
                               *----------*
Curve ULT400EB1-2
P.I.  Station        1027+29.8929  N        1,617,953.64  E          543,545.33
Delta       =       2° 00' 15.36" (RT)
Degree      =       0° 11' 27.09"
Tangent     =              525.12
Length      =           1,050.13
Radius      =          30,020.00
External    =                4.59
Long Chord  =           1,050.08
Mid. Ord.   =                4.59
P.C.  Station        1022+04.7739  N        1,617,466.95  E          543,348.15
P.T.  Station        1032+54.9048  N        1,618,433.14  E          543,759.40
C.C.                               N        1,606,194.84  E          571,171.53
Back        = N  22° 03' 15.78" E
Ahead       = N  24° 03' 31.14" E
Chord Bear  = N  23° 03' 23.46" E

Course from PT ULT400EB1-2 to UE401 N 24° 03' 31.14" E Dist 323.39

Point UE401           N     1,618,728.44 E       543,891.24 Sta  1035+78.2990

================================================================================
Ending chain ULT400EB1 description
```

```
<*       7   Describe Chain ULT400EB2

Chain ULT400EB2 contains:
 CUR ULT400EB2-1 UE4201 UE4202

Beginning chain ULT400EB2 description
================================================================================

                                Curve Data
                               *----------*
Curve ULT400EB2-1
P.I.  Station        1130+50.4293  N        1,627,353.17  E          547,806.21
Delta       =       0° 55' 54.54" (LT)
Degree      =       0° 11' 06.55"
Tangent     =              251.64
Length      =              503.27
Radius      =          30,945.00
External    =                1.02
Long Chord  =              503.26
Mid. Ord.   =                1.02
P.C.  Station        1127+98.7900  N        1,627,123.00  E          547,704.50
P.T.  Station        1133+02.0574  N        1,627,584.96  E          547,904.17
C.C.                               N        1,639,630.64  E          519,399.87
Back        = N  23° 50' 25.20" E
Ahead       = N  22° 54' 30.66" E
Chord Bear  = N  23° 22' 27.93" E

Course from PT ULT400EB2-1 to UE4201 N 22° 54' 30.66" E Dist 1,588.62

Point UE4201          N     1,629,048.28 E       548,522.55 Sta  1148+90.6778

Course from UE4201 to UE4202 N 23° 35' 21.76" E Dist 1,981.00

Point UE4202          N     1,630,863.75 E       549,315.31 Sta  1168+71.6788

================================================================================
Ending chain ULT400EB2 description


<*       8   Describe Chain SR400WB

Chain SR400WB contains:
 WB1000 CUR SR400WB-1 CUR SR400WB-2 CUR SR400WB-3 WB1001 CUR SR400WB-4 CUR SR40-
0WB-5 CUR SR400WB-6 WB1002

Beginning chain SR400WB description
================================================================================

Point WB1000          N     1,618,787.15 E       543,868.19 Sta  2036+20.2464

Course from WB1000 to PC SR400WB-1 N 24° 03' 24.84" E Dist 100.00

                                Curve Data
                               *----------*
Curve SR400WB-1
P.I.  Station        2042+07.3276  N        1,619,323.24  E          544,107.51
Delta       =       5° 04' 10.00" (LT)
Degree      =       0° 31' 14.62"
Tangent     =              487.08
Length      =              973.53
Radius      =          11,003.00
External    =               10.78
Long Chord  =              973.21
Mid. Ord.   =               10.77
P.C.  Station        2037+20.2454  N        1,618,878.47  E          543,908.95
P.T.  Station        2046+93.7742  N        1,619,783.82  E          544,265.99
C.C.                               N        1,623,363.77  E          533,861.66
Back        = N  24° 03' 24.84" E
Ahead       = N  18° 59' 14.84" E
Chord Bear  = N  21° 31' 19.84" E
```

```
                                Curve Data
                               *----------*
Curve SR400WB-2
P.I.  Station        2055+65.6699  N        1,620,608.28  E          544,549.67
Delta       =       6° 47' 55.75" (RT)
Degree      =       0° 23' 25.24"
Tangent     =              871.90
Length      =           1,741.74
Radius      =          14,678.23
External    =              25.87
Long Chord  =           1,740.72
Mid. Ord.   =              25.83
P.C.  Station        2046+93.7742  N        1,619,783.82  E          544,265.99
P.T.  Station        2064+35.5189  N        1,621,393.35  E          544,928.96
C.C.                               N        1,615,008.10  E          558,145.57
Back        = N  18° 59' 14.84" E
Ahead       = N  25° 47' 10.59" E
Chord Bear  = N  22° 23' 12.72" E

                                Curve Data
                               *----------*
Curve SR400WB-3
P.I.  Station        2067+74.3468  N        1,621,698.44  E          545,076.35
Delta       =       1° 41' 00.30" (LT)
Degree      =       0° 14' 54.37"
Tangent     =              338.83
Length      =              677.61
Radius      =          23,062.63
External    =               2.49
Long Chord  =             677.58
Mid. Ord.   =               2.49
P.C.  Station        2064+35.5189  N        1,621,393.35  E          544,928.96
P.T.  Station        2071+13.1258  N        1,622,007.73  E          545,214.72
C.C.                               N        1,631,425.95  E          524,162.83
Back        = N  25° 47' 10.59" E
Ahead       = N  24° 06' 10.29" E
Chord Bear  = N  24° 56' 40.44" E

Course from PT SR400WB-3 to WB1001 N 24° 06' 10.29" E Dist 1,363.21

Point WB1001          N     1,623,252.08 E       545,771.42 Sta  2084+76.3310

Course from WB1001 to PC SR400WB-4 N 24° 06' 10.29" E Dist 1,317.22

                                Curve Data
                               *----------*
Curve SR400WB-4
P.I.  Station        2100+09.5206  N        1,624,651.59  E          546,397.54
Delta       =       1° 04' 47.35" (RT)
Degree      =       0° 15' 00.01"
Tangent     =              215.97
Length      =              431.92
Radius      =          22,918.00
External    =               1.02
Long Chord  =             431.92
Mid. Ord.   =               1.02
P.C.  Station        2097+93.5534  N        1,624,454.46  E          546,309.34
P.T.  Station        2102+25.4749  N        1,624,847.04  E          546,489.43
C.C.                               N        1,615,095.30  E          567,229.21
Back        = N  24° 06' 10.29" E
Ahead       = N  25° 10' 57.64" E
Chord Bear  = N  24° 38' 33.96" E

Course from PT SR400WB-4 to PC SR400WB-5 N 25° 10' 57.64" E Dist 1,913.39

                                Curve Data
                               *----------*
Curve SR400WB-5
P.I.  Station        2124+09.0796  N        1,626,823.10  E          547,418.57
Delta       =       2° 06' 14.96" (RT)
Degree      =       0° 23' 21.83"
```

```
Tangent     =              270.21
Length      =              540.36
Radius      =           14,714.00
External    =                2.48
Long Chord  =              540.33
Mid. Ord.   =                2.48
P.C.  Station        2121+38.8675  N        1,626,578.57  E          547,303.59
P.T.  Station        2126+79.2309  N        1,627,063.24  E          547,542.45
C.C.                               N        1,620,317.68  E          560,619.11
Back        = N  25° 10' 57.64" E
Ahead       = N  27° 17' 12.60" E
Chord Bear  = N  26° 14' 05.12" E

                                Curve Data
                               *----------*
Curve SR400WB-6
P.I.  Station        2130+25.2223  N        1,627,370.74  E          547,701.06
Delta       =       3° 36' 07.80" (LT)
Degree      =       0° 31' 14.62"
Tangent     =              345.99
Length      =              691.75
Radius      =           11,003.00
External    =                5.44
Long Chord  =              691.64
Mid. Ord.   =                5.44
P.C.  Station        2126+79.2309  N        1,627,063.24  E          547,542.45
P.T.  Station        2133+70.9857  N        1,627,687.58  E          547,840.05
C.C.                               N        1,632,107.52  E          537,763.83
Back        = N  27° 17' 12.60" E
Ahead       = N  23° 41' 04.80" E
Chord Bear  = N  25° 29' 08.70" E

Course from PT SR400WB-6 to WB1002 N 23° 41' 04.80" E Dist 167.72

Point WB1002          N     1,627,841.18 E       547,907.43 Sta  2135+38.7097

================================================================================
Ending chain SR400WB description


<*       9   Describe Chain ULT400WB1

Chain ULT400WB1 contains:
 UW400 CUR ULT400WB1-1 UW401 CUR ULT400WB1-2 CUR ULT400WB1-3 CUR ULT400WB1-4 CU-
R ULT400WB1-5

Beginning chain ULT400WB1 description
================================================================================

Point UW400           N     1,615,486.17 E       542,377.37 Sta  1999+99.6400

Course from UW400 to PC ULT400WB1-1 N 24° 47' 17.57" E Dist 633.92

                                Curve Data
                               *----------*
Curve ULT400WB1-1
P.I.  Station        2011+59.8619  N        1,616,539.49  E          542,863.81
Delta       =       3° 19' 51.99" (LT)
Degree      =       0° 18' 59.58"
Tangent     =              526.30
Length      =            1,052.31
Radius      =           18,100.00
External    =                7.65
Long Chord  =            1,052.16
Mid. Ord.   =                7.65
P.C.  Station        2006+33.5575  N        1,616,061.68  E          542,643.15
P.T.  Station        2016+85.8698  N        1,617,029.32  E          543,056.34
C.C.                               N        1,623,650.38  E          526,210.82
Back        = N  24° 47' 17.57" E
Ahead       = N  21° 27' 25.58" E
Chord Bear  = N  23° 07' 21.57" E
```

Course from PT ULT400WB1-1 to UW401 N 21° 27' 25.58" E Dist 826.09

Point UW401 N 1,617,798.16 E 543,358.52 Sta 2025+11.9590

Course from UW401 to PC ULT400WB1-2 N 22° 12' 25.58" E Dist 1,909.82

Curve Data

Curve ULT400WB1-2

P.I. Station	2047+19.6582	N	1,619,842.10	E	544,192.93
Delta =	2° 11' 44.15"	(RT)			
Degree =	0° 22' 06.89"				
Tangent =	297.88				
Length =	595.69				
Radius =	15,545.00				
External =	2.85				
Long Chord =	595.65				
Mid. Ord. =	2.85				
P.C. Station	2044+21.7762	N	1,619,566.31	E	544,080.35
P.T. Station	2050+17.4672	N	1,620,113.37	E	544,316.00
C.C.		N	1,613,690.99	E	558,472.28

Back = N 22° 12' 25.58" E
Ahead = N 24° 24' 09.73" E
Chord Bear = N 23° 18' 17.65" E

Curve Data

Curve ULT400WB1-3

P.I. Station	2055+85.8975	N	1,620,631.02	E	544,550.85
Delta =	2° 05' 42.76"	(RT)			
Degree =	0° 11' 03.55"				
Tangent =	568.43				
Length =	1,136.73				
Radius =	31,085.22				
External =	5.20				
Long Chord =	1,136.67				
Mid. Ord. =	5.20				
P.C. Station	2050+17.4672	N	1,620,113.37	E	544,316.00
P.T. Station	2061+54.2011	N	1,621,139.73	E	544,804.46
C.C.		N	1,607,270.59	E	572,624.20

Back = N 24° 24' 09.73" E
Ahead = N 26° 29' 52.49" E
Chord Bear = N 25° 27' 01.11" E

Curve Data

Curve ULT400WB1-4

P.I. Station	2066+33.2752	N	1,621,568.48	E	545,018.21
Delta =	2° 23' 42.19"	(LT)			
Degree =	0° 15' 00.01"				
Tangent =	479.07				
Length =	958.01				
Radius =	22,918.00				
External =	5.01				
Long Chord =	957.94				
Mid. Ord. =	5.01				
P.C. Station	2061+54.2011	N	1,621,139.73	E	544,804.46
P.T. Station	2071+12.2098	N	1,622,005.79	E	545,213.85
C.C.		N	1,631,364.95	E	524,293.98

Back = N 26° 29' 52.49" E
Ahead = N 24° 06' 10.29" E
Chord Bear = N 25° 18' 01.39" E

Curve Data

Curve ULT400WB1-5

P.I. Station	2075+91.2839	N	1,621,568.48	E	545,018.21
Delta =	2° 23' 42.19"	(RT)			
Degree =	0° 15' 00.01"				
Tangent =	479.07				

```
Length      =             958.01
Radius      =          22,918.00
External    =                5.01
Long Chord  =             957.94
Mid. Ord.   =                5.01
P.C.  Station        2071+12.2098  N        1,622,005.79  E          545,213.85
P.T.  Station        2080+70.2185  N        1,621,139.73  E          544,804.46
C.C.                               N        1,631,364.95  E          524,293.98
Back        = S  24° 06' 10.29" W
Ahead       = S  26° 29' 52.49" W
Chord Bear  = S  25° 18' 01.39" W

================================================================================
Ending chain ULT400WB1 description


<*      10   Describe Chain ULT400WB2

Chain ULT400WB2 contains:
 UW4200 CUR ULT400WB2-1 CUR ULT400WB2-2 UW4201 UW4202 UW4203

Beginning chain ULT400WB2 description
================================================================================

Point UW4200          N     1,626,578.57 E       547,303.59 Sta  2121+40.0745

Course from UW4200 to PC ULT400WB2-1 N 25° 10' 57.64" E Dist 234.33

                                Curve Data
                               *----------*
Curve ULT400WB2-1
P.I.  Station        2125+88.0386  N        1,626,983.96  E          547,494.20
Delta       =       0° 28' 44.69" (LT)
Degree      =       0° 06' 43.65"
Tangent     =              213.64
Length      =              427.27
Radius      =          51,100.00
External    =                0.45
Long Chord  =             427.27
Mid. Ord.   =                0.45
P.C.  Station        2123+74.4000  N        1,626,790.63  E          547,403.30
P.T.  Station        2128+01.6747  N        1,627,178.05  E          547,583.49
C.C.                               N        1,648,533.97  E          501,160.06
Back        = N  25° 10' 57.64" E
Ahead       = N  24° 42' 12.95" E
Chord Bear  = N  24° 56' 35.29" E

                                Curve Data
                               *----------*
Curve ULT400WB2-2
P.I.  Station        2132+67.8928  N        1,627,601.60  E          547,778.33
Delta       =       1° 02' 43.67" (LT)
Degree      =       0° 06' 43.65"
Tangent     =              466.22
Length      =              932.41
Radius      =          51,100.00
External    =                2.13
Long Chord  =             932.40
Mid. Ord.   =                2.13
P.C.  Station        2128+01.6747  N        1,627,178.05  E          547,583.49
P.T.  Station        2137+34.0850  N        1,628,028.63  E          547,965.42
C.C.                               N        1,648,533.97  E          501,160.06
Back        = N  24° 42' 12.95" E
Ahead       = N  23° 39' 29.28" E
Chord Bear  = N  24° 10' 51.11" E

Course from PT ULT400WB2-2 to UW4201 N 23° 39' 29.28" E Dist 448.14

Point UW4201          N     1,628,439.11 E       548,145.24 Sta  2141+82.2254

Course from UW4201 to UW4202 N 23° 35' 21.76" E Dist 1,790.26
```

Point UW4202   N   1,630,079.77 E   548,861.67 Sta 2159+72.4878

Course from UW4202 to UW4203 N 23° 32' 04.47" E Dist 914.33

Point UW4203   N   1,630,918.04 E   549,226.76 Sta 2168+86.8145

==========
Ending chain ULT400WB2 description

<*   11   Describe Chain CLI4

Chain CLI4 contains:
 186 187 CUR CLI4-1 188 189 190 CUR CLI4-2 CUR CLI4-3 CUR CLI4-4 CUR CLI4-5 191-
 192 CUR CLI4-6 CUR CLI4-7 CUR CLI4-8 CUR CLI4-9 CUR CLI4-10 193 CUR CLI4-11 CU-
R CLI4-12 CUR CLI4-13 194 195

Beginning chain CLI4 description
==========

Point 186   N   1,585,952.75 E   531,964.53 Sta   186+00.0000

Course from 186 to 187 N 31° 40' 39.60" E Dist 1,983.60

Point 187   N   1,587,640.83 E   533,006.20 Sta   205+83.6050

Course from 187 to PC CLI4-1 N 31° 30' 31.24" E Dist 771.31

                                Curve Data

Curve CLI4-1
P.I. Station   220+57.6990 N   1,588,897.58 E   533,776.60
Delta   =   13° 59' 24.94" (LT)
Degree   =   1° 00' 01.15"
Tangent   =   702.79
Length   =   1,398.58
Radius   =   5,727.75
External   =   42.95
Long Chord =   1,395.11
Mid. Ord.   =   42.63
P.C. Station   213+54.9139 N   1,588,298.42 E   533,409.31
P.T. Station   227+53.4936 N   1,589,567.77 E   533,988.15
C.C.   N   1,591,291.90 E   528,526.05
Back   = N 31° 30' 31.24" E
Ahead   = N 17° 31' 06.30" E
Chord Bear = N 24° 30' 48.77" E

Course from PT CLI4-1 to 188 N 17° 31' 06.30" E Dist 843.18

Point 188   N   1,590,371.84 E   534,241.96 Sta   235+96.6689

Course from 188 to 189 N 17° 35' 18.60" E Dist 1,839.47

Point 189   N   1,592,125.32 E   534,797.81 Sta   254+36.1400

Course from 189 to 190 N 17° 30' 57.06" E Dist 496.07

Point 190   N   1,592,598.39 E   534,947.11 Sta   259+32.2094

Course from 190 to PC CLI4-2 N 17° 29' 36.82" E Dist 3,464.27

                                Curve Data

Curve CLI4-2
P.I. Station   298+46.5885 N   1,596,331.73 E   536,123.76
Delta   =   1° 09' 13.85" (LT)
Degree   =   0° 07' 41.44"
Tangent   =   450.11
Length   =   900.19
Radius   =   44,700.00

```
External    =               2.27
Long Chord  =             900.17
Mid. Ord.   =               2.27
P.C.  Station         293+96.4796  N        1,595,902.44  E          535,988.46
P.T.  Station         302+96.6669  N        1,596,763.66  E          536,250.39
C.C.                               N        1,609,339.20  E          493,355.80
Back        = N  17° 29' 36.82" E
Ahead       = N  16° 20' 22.97" E
Chord Bear  = N  16° 54' 59.90" E

                                  Curve Data
                                 *----------*
Curve CLI4-3
P.I.  Station         307+46.7465  N        1,597,195.56  E          536,377.02
Delta       =       1° 10' 34.09" (RT)
Degree      =       0° 07' 50.39"
Tangent     =             450.08
Length      =             900.13
Radius      =          43,850.00
External    =               2.31
Long Chord  =             900.11
Mid. Ord.   =               2.31
P.C.  Station         302+96.6669  N        1,596,763.66  E          536,250.39
P.T.  Station         311+96.7946  N        1,597,624.77  E          536,512.48
C.C.                               N        1,584,427.26  E          578,329.31
Back        = N  16° 20' 22.97" E
Ahead       = N  17° 30' 57.06" E
Chord Bear  = N  16° 55' 40.02" E

Course from PT CLI4-3 to PC CLI4-4 N 17° 30' 57.06" E Dist 2,331.95

                                  Curve Data
                                 *----------*
Curve CLI4-4
P.I.  Station         339+78.9316  N        1,600,277.91  E          537,349.82
Delta       =       1° 02' 36.27" (RT)
Degree      =       0° 06' 57.20"
Tangent     =             450.19
Length      =             900.35
Radius      =          49,440.00
External    =               2.05
Long Chord  =             900.33
Mid. Ord.   =               2.05
P.C.  Station         335+28.7460  N        1,599,848.60  E          537,214.32
P.T.  Station         344+29.0923  N        1,600,704.69  E          537,493.10
C.C.                               N        1,584,968.66  E          584,361.97
Back        = N  17° 30' 57.06" E
Ahead       = N  18° 33' 33.32" E
Chord Bear  = N  18° 02' 15.19" E

Course from PT CLI4-4 to PC CLI4-5 N 18° 33' 33.32" E Dist 1,175.71

                                  Curve Data
                                 *----------*
Curve CLI4-5
P.I.  Station         360+54.8376  N        1,602,245.88  E          538,010.55
Delta       =       1° 31' 22.65" (LT)
Degree      =       0° 10' 09.17"
Tangent     =             450.04
Length      =             900.02
Radius      =          33,860.00
External    =               2.99
Long Chord  =             899.99
Mid. Ord.   =               2.99
P.C.  Station         356+04.8013  N        1,601,819.25  E          537,867.31
P.T.  Station         365+04.8209  N        1,602,676.17  E          538,142.40
C.C.                               N        1,612,596.39  E          505,768.20
Back        = N  18° 33' 33.32" E
Ahead       = N  17° 02' 10.68" E
Chord Bear  = N  17° 47' 52.00" E
```

Course from PT CLI4-5 to 191 N 17° 02' 10.68" E Dist 1,603.47

Point 191 N 1,604,209.29 E 538,612.19 Sta 381+08.2954

Course from 191 to 192 N 17° 34' 46.85" E Dist 2,509.88

Point 192 N 1,606,601.95 E 539,370.25 Sta 406+18.1732

Course from 192 to PC CLI4-6 N 17° 30' 02.38" E Dist 4,738.11

Curve Data

Curve CLI4-6						
P.I. Station		457+36.8236	N	1,611,483.67	E	540,909.51
Delta	=	0° 52' 19.64"	(RT)			
Degree	=	0° 06' 52.53"				
Tangent	=	380.54				
Length	=	761.07				
Radius	=	50,000.00				
External	=	1.45				
Long Chord	=	761.06				
Mid. Ord.	=	1.45				
P.C. Station		453+56.2816	N	1,611,120.74	E	540,795.08
P.T. Station		461+17.3509	N	1,611,844.82	E	541,029.46
C.C.			N	1,596,084.91	E	588,480.75
Back	= N	17° 30' 02.38" E				
Ahead	= N	18° 22' 22.01" E				
Chord Bear	= N	17° 56' 12.19" E				

Course from PT CLI4-6 to PC CLI4-7 N 18° 22' 22.01" E Dist 1,115.64

Curve Data

Curve CLI4-7						
P.I. Station		479+41.1850	N	1,613,575.68	E	541,604.33
Delta	=	5° 30' 02.38"	(RT)			
Degree	=	0° 23' 19.16"				
Tangent	=	708.19				
Length	=	1,415.30				
Radius	=	14,742.00				
External	=	17.00				
Long Chord	=	1,414.76				
Mid. Ord.	=	16.98				
P.C. Station		472+32.9906	N	1,612,903.59	E	541,381.11
P.T. Station		486+48.2913	N	1,614,223.29	E	541,890.95
C.C.			N	1,608,256.94	E	555,371.65
Back	= N	18° 22' 22.01" E				
Ahead	= N	23° 52' 24.39" E				
Chord Bear	= N	21° 07' 23.20" E				

Course from PT CLI4-7 to PC CLI4-8 N 23° 52' 24.39" E Dist 2,056.12

Curve Data

Curve CLI4-8						
P.I. Station		512+19.7772	N	1,616,574.76	E	542,931.67
Delta	=	1° 49' 08.61"	(LT)			
Degree	=	0° 10' 35.38"				
Tangent	=	515.37				
Length	=	1,030.65				
Radius	=	32,463.00				
External	=	4.09				
Long Chord	=	1,030.61				
Mid. Ord.	=	4.09				
P.C. Station		507+04.4068	N	1,616,103.48	E	542,723.09
P.T. Station		517+35.0610	N	1,617,052.42	E	543,125.19
C.C.			N	1,629,241.84	E	513,037.57
Back	= N	23° 52' 24.39" E				
Ahead	= N	22° 03' 15.78" E				
Chord Bear	= N	22° 57' 50.09" E				

Course from PT CLI4-8 to PC CLI4-9 N 22° 03' 15.78" E Dist 2,041.51

Curve Data

Curve CLI4-9
P.I. Station = 545+70.1878 N 1,619,680.09 E 544,189.74
Delta = 3° 57' 27.92" (RT)
Degree = 0° 14' 58.01"
Tangent = 793.62
Length = 1,586.60
Radius = 22,969.00
External = 13.71
Long Chord = 1,586.29
Mid. Ord. = 13.70
P.C. Station = 537+76.5703 N 1,618,944.55 E 543,891.75
P.T. Station = 553+63.1741 N 1,620,393.32 E 544,537.79
C.C. N 1,610,320.00 E 565,180.06
Back = N 22° 03' 15.78" E
Ahead = N 26° 00' 43.70" E
Chord Bear = N 24° 01' 59.74" E

Course from PT CLI4-9 to PC CLI4-10 N 26° 00' 43.70" E Dist 745.37

Curve Data

Curve CLI4-10
P.I. Station = 566+33.6232 N 1,621,535.07 E 545,094.96
Delta = 2° 01' 27.64" (LT)
Degree = 0° 11' 34.03"
Tangent = 525.08
Length = 1,050.05
Radius = 29,720.00
External = 4.64
Long Chord = 1,050.00
Mid. Ord. = 4.64
P.C. Station = 561+08.5432 N 1,621,063.18 E 544,864.68
P.T. Station = 571+58.5940 N 1,622,014.80 E 545,308.43
C.C. N 1,634,097.23 E 518,155.28
Back = N 26° 00' 43.70" E
Ahead = N 23° 59' 16.07" E
Chord Bear = N 24° 59' 59.88" E

Course from PT CLI4-10 to 193 N 23° 59' 16.07" E Dist 1,318.48

Point 193 N 1,623,219.40 E 545,844.44 Sta 584+77.0696

Course from 193 to PC CLI4-11 N 24° 06' 10.29" E Dist 2,409.35

Curve Data

Curve CLI4-11
P.I. Station = 614+11.4683 N 1,625,897.96 E 547,042.78
Delta = 1° 23' 43.50" (RT)
Degree = 0° 07' 58.41"
Tangent = 525.05
Length = 1,050.05
Radius = 43,115.00
External = 3.20
Long Chord = 1,050.02
Mid. Ord. = 3.20
P.C. Station = 608+86.4177 N 1,625,418.69 E 546,828.36
P.T. Station = 619+36.4670 N 1,626,371.87 E 547,268.81
C.C. N 1,607,811.56 E 586,184.33
Back = N 24° 06' 10.29" E
Ahead = N 25° 29' 53.79" E
Chord Bear = N 24° 48' 02.04" E

Course from PT CLI4-11 to PC CLI4-12 N 25° 29' 53.79" E Dist 283.50

Curve Data

```
Curve CLI4-12
P.I.  Station         627+45.0878  N        1,627,101.73  E          547,616.91
Delta       =       1° 54' 32.03" (LT)
Degree      =       0° 10' 54.39"
Tangent     =              525.12
Length      =           1,050.14
Radius      =          31,520.00
External    =               4.37
Long Chord  =           1,050.09
Mid. Ord.   =               4.37
P.C.  Station         622+19.9704  N        1,626,627.76  E          547,390.85
P.T.  Station         632+70.1080  N        1,627,582.97  E          547,827.05
C.C.                               N        1,640,196.62  E          518,940.95
Back        = N  25° 29' 53.79" E
Ahead       = N  23° 35' 21.76" E
Chord Bear  = N  24° 32' 37.78" E

Course from PT CLI4-12 to PC CLI4-13 N 23° 35' 21.76" E Dist 3,602.20

                                Curve Data
                               *----------*
Curve CLI4-13
P.I.  Station         678+20.4674  N        1,631,753.09  E          549,648.01
Delta       =      17° 57' 36.24" (RT)
Degree      =       0° 57' 17.75"
Tangent     =              948.16
Length      =           1,880.77
Radius      =           6,000.00
External    =              74.46
Long Chord  =           1,873.08
Mid. Ord.   =              73.54
P.C.  Station         668+72.3040  N        1,630,884.16  E          549,268.57
P.T.  Station         687+53.0778  N        1,632,462.68  E          550,276.89
C.C.                               N        1,628,483.08  E          554,767.19
Back        = N  23° 35' 21.76" E
Ahead       = N  41° 32' 58.00" E
Chord Bear  = N  32° 34' 09.88" E

Course from PT CLI4-13 to 194 N 41° 32' 58.00" E Dist 2,725.27

Point 194             N     1,634,502.23 E       552,084.47 Sta   714+78.3527

Course from 194 to 195 N 41° 32' 28.67" E Dist 2,878.45

Point 195             N     1,636,656.69 E       553,993.35 Sta   743+56.8067

================================================================================
Ending chain CLI4 description


<*      12   Describe Chain WILSON

Chain WILSON contains:
 WILSON10 WILSON11 WILSON12 WILSON13 WILSON14

Beginning chain WILSON description
================================================================================

Point WILSON10        N     1,624,070.01 E       541,391.60 Sta    10+00.0000

Course from WILSON10 to WILSON11 N 89° 50' 55.18" E Dist 487.19

Point WILSON11        N     1,624,071.30 E       541,878.78 Sta    14+87.1868

Course from WILSON11 to WILSON12 N 89° 22' 26.51" E Dist 113.81

Point WILSON12        N     1,624,072.54 E       541,992.58 Sta    16+00.9961

Course from WILSON12 to WILSON13 N 89° 07' 29.60" E Dist 115.03

Point WILSON13        N     1,624,074.30 E       542,107.60 Sta    17+16.0266
```

Course from WILSON13 to WILSON14 S 89° 53' 32.94" E Dist 334.82

Point WILSON14   N   1,624,073.67 E   542,442.42 Sta   20+50.8452

==========
Ending chain WILSON description

<*   13   Describe Chain INPK_A1

Chain INPK_A1 contains:
 INPK63 CUR INPK_A1-1 CUR INPK_A1-2 CUR INPK_A1-3 CUR INPK_A1-4 INPK64

Beginning chain INPK_A1 description
==========

Point INPK63   N   1,618,724.16 E   541,484.77 Sta   63+00.0000

Course from INPK63 to PC INPK_A1-1 N 0° 02' 00.79" E Dist 1,271.14

		Curve Data				
Curve INPK_A1-1						
P.I. Station		81+37.3043	N	1,620,561.47	E	541,485.85
Delta	=	43° 08' 01.23"	(RT)			
Degree	=	4° 00' 00.05"				
Tangent	=	566.16				
Length	=	1,078.34				
Radius	=	1,432.39				
External	=	107.83				
Long Chord	=	1,053.05				
Mid. Ord.	=	100.28				
P.C. Station		75+71.1398	N	1,619,995.30	E	541,485.51
P.T. Station		86+49.4783	N	1,620,974.40	E	541,873.18
C.C.			N	1,619,994.46	E	542,917.90
Back	= N	0° 02' 00.79" E				
Ahead	= N	43° 10' 02.02" E				
Chord Bear	= N	21° 36' 01.41" E				

Course from PT INPK_A1-1 to PC INPK_A1-2 N 43° 10' 02.02" E Dist 601.19

		Curve Data				
Curve INPK_A1-2						
P.I. Station		95+73.1218	N	1,621,648.07	E	542,505.07
Delta	=	25° 22' 24.99"	(LT)			
Degree	=	4° 00' 00.05"				
Tangent	=	322.46				
Length	=	634.34				
Radius	=	1,432.39				
External	=	35.85				
Long Chord	=	629.17				
Mid. Ord.	=	34.97				
P.C. Station		92+50.6654	N	1,621,412.89	E	542,284.47
P.T. Station		98+85.0037	N	1,621,955.10	E	542,603.61
C.C.			N	1,622,392.83	E	541,239.74
Back	= N	43° 10' 02.02" E				
Ahead	= N	17° 47' 37.03" E				
Chord Bear	= N	30° 28' 49.53" E				

Course from PT INPK_A1-2 to PC INPK_A1-3 N 17° 47' 37.03" E Dist 568.99

		Curve Data				
Curve INPK_A1-3						
P.I. Station		110+52.9500	N	1,623,067.18	E	542,960.52
Delta	=	55° 11' 28.37"	(RT)			
Degree	=	4° 59' 59.93"				
Tangent	=	598.96				
Length	=	1,103.83				

```
Radius      =            1,145.92
External    =              147.09
Long Chord  =            1,061.64
Mid. Ord.   =              130.36
P.C.  Station         104+53.9893  N        1,622,496.87  E          542,777.48
P.T.  Station         115+57.8179  N        1,623,242.45  E          543,533.26
C.C.                               N        1,622,146.69  E          543,868.59
Back        = N  17° 47' 37.03" E
Ahead       = N  72° 59' 05.41" E
Chord Bear  = N  45° 23' 21.22" E

Course from PT INPK_A1-3 to PC INPK_A1-4 N 72° 59' 05.41" E Dist 399.33

                                Curve Data
                               *----------*
Curve INPK_A1-4
P.I.  Station         128+00.9577  N        1,623,606.22  E          544,721.99
Delta       =      72° 43' 57.84" (LT)
Degree      =       4° 59' 59.93"
Tangent     =              843.81
Length      =            1,454.66
Radius      =            1,145.92
External    =              277.16
Long Chord  =            1,358.94
Mid. Ord.   =              223.18
P.C.  Station         119+57.1504  N        1,623,359.31  E          543,915.12
P.T.  Station         134+11.8107  N        1,624,450.02  E          544,725.70
C.C.                               N        1,624,455.07  E          543,579.79
Back        = N  72° 59' 05.41" E
Ahead       = N   0° 15' 07.56" E
Chord Bear  = N  36° 37' 06.48" E

Course from PT INPK_A1-4 to INPK64 N 0° 15' 07.56" E Dist 2,283.29

Point INPK64          N     1,626,733.29 E       544,735.75 Sta   156+95.1039

================================================================================
Ending chain INPK_A1 description


<*      14   Describe Chain TOWNCTR

Chain TOWNCTR contains:
 TC10 CUR TOWNCTR-1

Beginning chain TOWNCTR description
================================================================================

Point TC10            N     1,622,046.44 E       547,526.35 Sta    10+00.0000

Course from TC10 to PC TOWNCTR-1 N 17° 44' 02.30" E Dist 482.71

                                Curve Data
                               *----------*
Curve TOWNCTR-1
P.I.  Station          17+17.9137  N        1,622,730.24  E          547,745.02
Delta       =      37° 38' 43.08" (LT)
Degree      =       8° 18' 13.45"
Tangent     =              235.20
Length      =              453.35
Radius      =              690.00
External    =               38.98
Long Chord  =              445.24
Mid. Ord.   =               36.90
P.C.  Station          14+82.7141  N        1,622,506.21  E          547,673.38
P.T.  Station          19+36.0679  N        1,622,951.38  E          547,664.92
C.C.                               N        1,622,716.39  E          547,016.17
Back        = N  17° 44' 02.30" E
Ahead       = N  19° 54' 40.77" W
Chord Bear  = N   1° 05' 19.24" W
```

```
================================================================================
Ending chain TOWNCTR description


<*      15   Describe Chain RINHT

Chain RINHT contains:
 CUR RINHT-1

Beginning chain RINHT description
================================================================================

                                 Curve Data
                                *----------*
Curve RINHT-1
P.I.  Station          15+67.2060  N        1,622,872.98  E          549,880.16
Delta       =      25° 22' 41.25" (LT)
Degree      =       2° 16' 27.93"
Tangent     =              567.21
Length      =            1,115.80
Radius      =            2,519.13
External    =               63.07
Long Chord  =            1,106.71
Mid. Ord.   =               61.53
P.C.  Station          10+00.0000  N        1,622,442.93  E          549,510.33
P.T.  Station          21+15.8045  N        1,623,420.04  E          550,030.00
C.C.                               N        1,624,085.49  E          547,600.34
Back        = N  40° 41' 42.19" E
Ahead       = N  15° 19' 00.94" E
Chord Bear  = N  28° 00' 21.57" E

================================================================================
Ending chain RINHT description


<*      16   Describe Chain METZ

Chain METZ contains:
 MZ001 CUR METZ-1 CUR METZ-2 MZ002

Beginning chain METZ description
================================================================================

Point MZ001           N     1,624,070.73 E       541,663.84 Sta     5+00.0000

Course from MZ001 to PC METZ-1 S 0° 09' 04.82" E Dist 69.34

                                 Curve Data
                                *----------*
Curve METZ-1
P.I.  Station            6+49.5245  N        1,623,921.20  E          541,664.24
Delta       =      71° 11' 49.24" (LT)
Degree      =      51° 09' 25.01"
Tangent     =               80.18
Length      =             139.17
Radius      =             112.00
External    =               25.74
Long Chord  =             130.39
Mid. Ord.   =               20.93
P.C.  Station            5+69.3448  N        1,624,001.38  E          541,664.03
P.T.  Station            7+08.5185  N        1,623,895.56  E          541,740.21
C.C.                               N        1,624,001.68  E          541,776.03
Back        = S   0° 09' 04.82" E
Ahead       = S  71° 20' 54.06" E
Chord Bear  = S  35° 44' 59.44" E

Course from PT METZ-1 to PC METZ-2 S 71° 20' 54.06" E Dist 48.67

                                 Curve Data
                                *----------*
Curve METZ-2
```

```
P.I.  Station           8+10.4653  N        1,623,862.96  E          541,836.80
Delta       =      28° 12' 39.53" (RT)
Degree      =      27° 01' 34.72"
Tangent     =              53.27
Length      =             104.38
Radius      =             212.00
External    =               6.59
Long Chord  =             103.33
Mid. Ord.   =               6.39
P.C.  Station           7+57.1930  N        1,623,879.99  E          541,786.32
P.T.  Station           8+61.5764  N        1,623,824.08  E          541,873.22
C.C.                               N        1,623,679.13  E          541,718.52
Back        = S  71° 20' 54.06" E
Ahead       = S  43° 08' 14.53" E
Chord Bear  = S  57° 14' 34.29" E

Course from PT METZ-2 to MZ002 S 43° 08' 14.52" E Dist 294.14

Point MZ002           N     1,623,609.44 E       542,074.34 Sta    11+55.7165

================================================================================
Ending chain METZ description


<*      17   Describe Chain EE2

Chain EE2 contains:
 CUR EE2-1 CUR EE2-2 SHIFT  CUR EE2-3 CUR EE2-4 CUR EE2-5

Beginning chain EE2 description
Description: CUR EE2-1 CUR EE2-2 CUR EE2-3 CUR EE2-4 CUR EE2-5
================================================================================

                                Curve Data
                               *----------*
Curve EE2-1
P.I.  Station          10+36.2885  N        1,622,856.17  E          544,533.55
Delta       =       0° 54' 08.65" (LT)
Degree      =       1° 14' 36.23"
Tangent     =               36.29
Length      =               72.58
Radius      =           4,608.00
External    =               0.14
Long Chord  =               72.57
Mid. Ord.   =               0.14
P.C.  Station          10+00.0000  N        1,622,862.12  E          544,497.75
P.T.  Station          10+72.5754  N        1,622,850.79  E          544,569.44
C.C.                               N        1,627,407.74  E          545,253.43
Back        = S  80° 33' 40.59" E
Ahead       = S  81° 27' 49.24" E
Chord Bear  = S  81° 00' 44.92" E

                                Curve Data
                               *----------*
Curve EE2-2
P.I.  Station          13+70.1268  N        1,622,806.62  E          544,863.69
Delta       =      34° 06' 25.93" (LT)
Degree      =       5° 54' 24.41"
Tangent     =              297.55
Length      =              577.42
Radius      =              970.00
External    =               44.61
Long Chord  =              568.94
Mid. Ord.   =               42.65
P.C.  Station          10+72.5754  N        1,622,850.79  E          544,569.44
P.T.  Station          16+50.0000  N        1,622,935.05  E          545,132.10
C.C.                               N        1,623,810.04  E          544,713.42
Back        = S  81° 27' 49.24" E
Ahead       = N  64° 25' 44.83" E
Chord Bear  = N  81° 28' 57.79" E
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----- Shift: 15.00 (LT) at station 16+50.0000

```
                                Curve Data
                               *-----------*
Curve EE2-3
P.I.  Station          19+19.9526  N        1,623,065.10  E          545,369.14
Delta       =      31° 34' 05.95" (LT)
Degree      =       5° 59' 58.41"
Tangent     =              269.95
Length      =              526.18
Radius      =              955.00
External    =               37.42
Long Chord  =              519.55
Mid. Ord.   =               36.01
P.C.  Station          16+50.0000  N        1,622,948.58  E          545,125.63
P.T.  Station          21+76.1774  N        1,623,291.86  E          545,515.61
C.C.                               N        1,623,810.04  E          544,713.42
Back        = N  64° 25' 44.08" E
Ahead       = N  32° 51' 38.14" E
Chord Bear  = N  48° 38' 41.11" E

Course from PT EE2-3 to PC EE2-4 N 32° 51' 38.14" E Dist 743.89

                                Curve Data
                               *-----------*
Curve EE2-4
P.I.  Station          30+25.4036  N        1,624,005.20  E          545,976.40
Delta       =       8° 14' 32.16" (RT)
Degree      =       3° 55' 08.40"
Tangent     =              105.34
Length      =              210.32
Radius      =            1,462.00
External    =                3.79
Long Chord  =              210.13
Mid. Ord.   =                3.78
P.C.  Station          29+20.0641  N        1,623,916.72  E          545,919.24
P.T.  Station          31+30.3796  N        1,624,084.58  E          546,045.65
C.C.                               N        1,623,123.44  E          547,147.31
Back        = N  32° 51' 38.14" E
Ahead       = N  41° 06' 10.29" E
Chord Bear  = N  36° 58' 54.21" E

Course from PT EE2-4 to PC EE2-5 N 41° 06' 10.29" E Dist 223.77

                                Curve Data
                               *-----------*
Curve EE2-5
P.I.  Station          35+70.4073  N        1,624,416.15  E          546,334.93
Delta       =      17° 00' 00.00" (LT)
Degree      =       3° 57' 34.65"
Tangent     =              216.26
Length      =              429.33
Radius      =            1,447.00
External    =               16.07
Long Chord  =              427.76
Mid. Ord.   =               15.89
P.C.  Station          33+54.1517  N        1,624,253.20  E          546,192.76
P.T.  Station          37+83.4852  N        1,624,613.56  E          546,423.24
C.C.                               N        1,625,204.48  E          545,102.40
Back        = N  41° 06' 10.29" E
Ahead       = N  24° 06' 10.29" E
Chord Bear  = N  32° 36' 10.29" E

================================================================================
Ending chain EE2 description


<*      18   Describe Chain EE3

Chain EE3 contains:
 CUR EE3-1 EE311 SHIFT  EE312 CUR EE3-2
```

```
Beginning chain EE3 description
================================================================================

                                Curve Data
                               *----------*
Curve EE3-1
P.I.  Station          12+00.2688  N        1,623,035.99  E          545,546.57
Delta       =       5° 00' 11.41" (LT)
Degree      =       1° 14' 59.67"
Tangent     =              200.27
Length      =              400.28
Radius      =           4,584.00
External    =                4.37
Long Chord  =              400.16
Mid. Ord.   =                4.37
P.C.  Station          10+00.0000  N        1,622,853.18  E          545,464.79
P.T.  Station          14+00.2830  N        1,623,225.23  E          545,612.10
C.C.                               N        1,624,725.18  E          541,280.45
Back        = N  24° 06' 10.29" E
Ahead       = N  19° 05' 58.88" E
Chord Bear  = N  21° 36' 04.59" E

Course from PT EE3-1 to EE311 N 19° 05' 58.88" E Dist 28.41

Point EE311           N     1,623,252.07 E       545,621.40 Sta    14+28.6882

----- Shift: 15.00 (RT) at station 14+28.6882

Point EE312           N     1,623,247.17 E       545,635.57 Sta    14+28.6882

Course from EE312 to PC EE3-2 N 19° 05' 58.88" E Dist 126.35

                                Curve Data
                               *----------*
Curve EE3-2
P.I.  Station          18+36.3872  N        1,623,632.42  E          545,768.97
Delta       =      11° 06' 20.17" (RT)
Degree      =       1° 58' 47.33"
Tangent     =              281.35
Length      =              560.94
Radius      =           2,894.00
External    =               13.64
Long Chord  =              560.06
Mid. Ord.   =               13.58
P.C.  Station          15+55.0347  N        1,623,366.56  E          545,676.91
P.T.  Station          21+15.9769  N        1,623,875.57  E          545,910.52
C.C.                               N        1,622,419.60  E          548,411.60
Back        = N  19° 05' 58.88" E
Ahead       = N  30° 12' 19.06" E
Chord Bear  = N  24° 39' 08.97" E

================================================================================
Ending chain EE3 description


<*      19   Describe Chain EE4

Chain EE4 contains:
 EE410 CUR EE4-1 EE411 SHIFT  EE412 CUR EE4-2

Beginning chain EE4 description
Description: EE410 CUR EE4-1 EE411 EE412 CUR EE4-2
================================================================================

Point EE410           N     1,619,082.66 E       543,992.59 Sta    10+00.0000

Course from EE410 to PC EE4-1 N 25° 40' 56.81" E Dist 343.90

                                Curve Data
                               *----------*
```

```
Curve EE4-1
P.I.  Station          15+59.1679  N        1,619,586.59  E          544,234.92
Delta       =      21° 12' 19.48" (RT)
Degree      =       4° 58' 56.07"
Tangent     =              215.27
Length      =              425.62
Radius      =           1,150.00
External    =               19.98
Long Chord  =              423.19
Mid. Ord.   =               19.63
P.C.  Station          13+43.8950  N        1,619,392.58  E          544,141.62
P.T.  Station          17+69.5149  N        1,619,733.71  E          544,392.07
C.C.                               N        1,618,894.19  E          545,178.02
Back        = N  25° 40' 56.81" E
Ahead       = N  46° 53' 16.29" E
Chord Bear  = N  36° 17' 06.55" E

Course from PT EE4-1 to EE411 N 46° 53' 16.29" E Dist 230.49

Point EE411           N     1,619,891.23 E       544,560.33 Sta    20+00.0000

----- Shift: 15.00 (LT) at station 20+00.0000

Point EE412           N     1,619,902.18 E       544,550.08 Sta    20+00.0000

Course from EE412 to PC EE4-2 N 46° 53' 16.29" E Dist 149.95

                                Curve Data
                               *-----------*
Curve EE4-2
P.I.  Station          23+14.2397  N        1,620,116.94  E          544,779.48
Delta       =      22° 23' 34.88" (LT)
Degree      =       6° 54' 11.18"
Tangent     =              164.29
Length      =              324.39
Radius      =              830.00
External    =               16.10
Long Chord  =              322.33
Mid. Ord.   =               15.80
P.C.  Station          21+49.9477  N        1,620,004.66  E          544,659.54
P.T.  Station          24+74.3383  N        1,620,266.45  E          544,847.60
C.C.                               N        1,620,610.57  E          544,092.30
Back        = N  46° 53' 16.29" E
Ahead       = N  24° 29' 41.41" E
Chord Bear  = N  35° 41' 28.85" E

================================================================================
Ending chain EE4 description


<*      20   Describe Chain EE5

Chain EE5 contains:
 EE510 CUR EE5-1 CUR EE5-2 SHIFT  CUR EE5-3 CUR EE5-4 CUR EE5-5

Beginning chain EE5 description
================================================================================

Point EE510           N     1,624,450.27 E       546,616.41 Sta    10+00.0000

Course from EE510 to PC EE5-1 N 14° 43' 47.89" E Dist 688.33

                                Curve Data
                               *-----------*
Curve EE5-1
P.I.  Station          19+24.1744  N        1,625,344.07  E          546,851.40
Delta       =       9° 22' 22.40" (RT)
Degree      =       1° 59' 29.44"
Tangent     =              235.85
Length      =              470.64
Radius      =           2,877.00
```

```
External    =               9.65
Long Chord  =             470.12
Mid. Ord.   =               9.62
P.C.  Station          16+88.3272  N        1,625,115.97  E          546,791.43
P.T.  Station          21+58.9692  N        1,625,559.35  E          546,947.71
C.C.                               N        1,624,384.45  E          549,573.88
Back        = N  14° 43' 47.89" E
Ahead       = N  24° 06' 10.29" E
Chord Bear  = N  19° 24' 59.09" E

Course from PT EE5-1 to PC EE5-2 N 24° 06' 10.29" E Dist 147.57

                                Curve Data
                               *----------*
Curve EE5-2
P.I.  Station          23+53.2721  N        1,625,736.71  E          547,027.06
Delta       =       0° 16' 13.35" (RT)
Degree      =       0° 17' 21.50"
Tangent     =              46.73
Length      =              93.46
Radius      =          19,804.50
External    =               0.06
Long Chord  =              93.46
Mid. Ord.   =               0.06
P.C.  Station          23+06.5441  N        1,625,694.06  E          547,007.98
P.T.  Station          24+00.0000  N        1,625,779.28  E          547,046.34
C.C.                               N        1,617,606.38  E          565,085.80
Back        = N  24° 06' 10.29" E
Ahead       = N  24° 22' 23.64" E
Chord Bear  = N  24° 14' 16.97" E

----- Shift: 15.00 (RT) at station 24+00.0000

                                Curve Data
                               *----------*
Curve EE5-3
P.I.  Station          25+52.9709  N        1,625,912.43  E          547,123.14
Delta       =       0° 53' 08.75" (RT)
Degree      =       0° 17' 22.29"
Tangent     =             152.97
Length      =             305.94
Radius      =          19,789.50
External    =               0.59
Long Chord  =             305.93
Mid. Ord.   =               0.59
P.C.  Station          24+00.0000  N        1,625,773.09  E          547,060.01
P.T.  Station          27+05.9358  N        1,626,050.77  E          547,188.41
C.C.                               N        1,617,606.38  E          565,085.80
Back        = N  24° 22' 23.64" E
Ahead       = N  25° 15' 32.39" E
Chord Bear  = N  24° 48' 58.01" E

Course from PT EE5-3 to PC EE5-4 N 25° 15' 32.39" E Dist 202.30

                                Curve Data
                               *----------*
Curve EE5-4
P.I.  Station          31+12.4337  N        1,626,418.40  E          547,361.87
Delta       =       2° 48' 22.29" (LT)
Degree      =       0° 41' 14.09"
Tangent     =             204.20
Length      =             408.32
Radius      =           8,337.00
External    =               2.50
Long Chord  =             408.28
Mid. Ord.   =               2.50
P.C.  Station          29+08.2311  N        1,626,233.72  E          547,274.73
P.T.  Station          33+16.5546  N        1,626,607.13  E          547,439.86
C.C.                               N        1,629,791.21  E          539,734.85
Back        = N  25° 15' 32.39" E
Ahead       = N  22° 27' 10.10" E
```

```
Chord Bear  = N  23° 51' 21.25" E

                                Curve Data
                               *----------*
Curve EE5-5
P.I.  Station          35+70.7104  N        1,626,842.01  E          547,536.92
Delta       =       2° 29' 12.97" (RT)
Degree      =       0° 29' 21.59"
Tangent     =              254.16
Length      =              508.23
Radius      =           11,709.00
External    =                2.76
Long Chord  =              508.19
Mid. Ord.   =                2.76
P.C.  Station          33+16.5546  N        1,626,607.13  E          547,439.86
P.T.  Station          38+24.7865  N        1,627,072.47  E          547,644.09
C.C.                               N        1,622,135.20  E          558,261.25
Back        = N  22° 27' 10.10" E
Ahead       = N  24° 56' 23.07" E
Chord Bear  = N  23° 41' 46.59" E

================================================================================
Ending chain EE5 description


<*      21   Describe Chain GG

Chain GG contains:
 CUR GG-1 SHIFT  CUR GG-2 CUR GG-3 GG11

Beginning chain GG description
================================================================================

                                Curve Data
                               *----------*
Curve GG-1
P.I.  Station          13+00.1543  N        1,624,810.52  E          541,419.83
Delta       =       4° 30' 00.93" (LT)
Degree      =       0° 45' 00.15"
Tangent     =              300.15
Length      =              600.00
Radius      =            7,639.00
External    =                5.89
Long Chord  =              599.85
Mid. Ord.   =                5.89
P.C.  Station          10+00.0000  N        1,625,035.44  E          541,221.08
P.T.  Station          16+00.0000  N        1,624,601.88  E          541,635.61
C.C.                               N        1,630,093.71  E          546,945.43
Back        = S  41° 27' 54.22" E
Ahead       = S  45° 57' 55.15" E
Chord Bear  = S  43° 42' 54.69" E

----- Shift: 15.00 (RT) at station 16+00.0000

                                Curve Data
                               *----------*
Curve GG-2
P.I.  Station          19+06.1449  N        1,624,378.30  E          541,845.28
Delta       =       4° 34' 51.58" (LT)
Degree      =       0° 44' 54.86"
Tangent     =              306.14
Length      =              611.96
Radius      =            7,654.00
External    =                6.12
Long Chord  =              611.80
Mid. Ord.   =                6.12
P.C.  Station          16+00.0000  N        1,624,591.10  E          541,625.19
P.T.  Station          22+11.9636  N        1,624,183.76  E          542,081.67
C.C.                               N        1,630,093.71  E          546,945.43
Back        = S  45° 57' 55.15" E
Ahead       = S  50° 32' 46.73" E
```

```
Chord Bear  = S  48° 15' 20.94" E

                                Curve Data
                               *-----------*
Curve GG-3
P.I.  Station          26+85.1673  N        1,623,883.06  E          542,447.05
Delta       =      11° 44' 57.45" (LT)
Degree      =       1° 14' 44.99"
Tangent     =             473.20
Length      =             943.09
Radius      =           4,599.00
External    =              24.28
Long Chord  =             941.44
Mid. Ord.   =              24.15
P.C.  Station          22+11.9636  N        1,624,183.76  E          542,081.67
P.T.  Station          31+55.0523  N        1,623,663.06  E          542,866.00
C.C.                               N        1,627,734.82  E          545,004.12
Back        = S  50° 32' 46.73" E
Ahead       = S  62° 17' 44.18" E
Chord Bear  = S  56° 25' 15.46" E

Course from PT GG-3 to GG11 S 62° 17' 44.18" E Dist 849.10

Point GG11            N     1,623,268.31 E       543,617.76 Sta    40+04.1500

================================================================================
Ending chain GG description


<*      22   Describe Chain HH1

Chain HH1 contains:
 10 11 SHIFT  12 CUR HH1-1 13 SHIFT  14 CUR HH1-2 CUR HH1-3

Beginning chain HH1 description
Description: 10 11 12 CUR HH1-1 13 14 CUR HH1-2 CUR HH1-3
================================================================================

Point 10              N     1,624,938.10 E       541,154.77 Sta    10+00.0000

Course from 10 to 11 S 36° 57' 54.22" E Dist 775.10

Point 11              N     1,624,318.79 E       541,620.86 Sta    17+75.1021

----- Shift: 15.00 (LT) at station 17+75.1021

Point 12              N     1,624,327.80 E       541,632.85 Sta    17+75.1021

Course from 12 to PC HH1-1 S 36° 57' 54.22" E Dist 30.15

                                Curve Data
                               *-----------*
Curve HH1-1
P.I.  Station          24+31.9230  N        1,623,803.00  E          542,027.82
Delta       =      18° 37' 58.34" (LT)
Degree      =       1° 29' 59.60"
Tangent     =             626.67
Length      =           1,242.28
Radius      =           3,820.00
External    =              51.06
Long Chord  =           1,236.82
Mid. Ord.   =              50.39
P.C.  Station          18+05.2487  N        1,624,303.71  E          541,650.98
P.T.  Station          30+47.5317  N        1,623,448.93  E          542,544.88
C.C.                               N        1,626,600.78  E          544,703.17
Back        = S  36° 57' 54.22" E
Ahead       = S  55° 35' 52.56" E
Chord Bear  = S  46° 16' 53.39" E

Course from PT HH1-1 to 13 S 55° 35' 52.56" E Dist 352.57
```

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Point 13              N     1,623,249.73 E       542,835.79 Sta    34+00.1028

----- Shift: 15.00 (RT) at station 34+00.1028

Point 14              N     1,623,237.35 E       542,827.31 Sta    34+00.1028

Course from 14 to PC HH1-2 S 55° 35' 52.56" E Dist 726.08

                                Curve Data
                               *----------*
Curve HH1-2
P.I.  Station          49+14.1483  N        1,622,381.92  E          544,076.54
Delta       =     134° 10' 52.31" (RT)
Degree      =      17° 12' 21.38"
Tangent     =              787.96
Length      =              779.85
Radius      =              333.00
External    =              522.44
Long Chord  =              613.47
Mid. Ord.   =              203.37
P.C.  Station          41+26.1876  N        1,622,827.11  E          543,426.40
P.T.  Station          49+06.0415  N        1,622,225.95  E          543,304.17
C.C.                               N        1,622,552.36  E          543,238.26
Back        = S  55° 35' 52.56" E
Ahead       = S  78° 34' 59.74" W
Chord Bear  = S  11° 29' 33.59" W

                                Curve Data
                               *----------*
Curve HH1-3
P.I.  Station          56+94.0022  N        1,622,069.98  E          542,531.80
Delta       =     134° 10' 52.30" (RT)
Degree      =      17° 12' 21.38"
Tangent     =              787.96
Length      =              779.85
Radius      =              333.00
External    =              522.44
Long Chord  =              613.47
Mid. Ord.   =              203.37
P.C.  Station          49+06.0415  N        1,622,225.95  E          543,304.17
P.T.  Station          56+85.8954  N        1,622,732.57  E          542,958.24
C.C.                               N        1,622,552.36  E          543,238.26
Back        = S  78° 34' 59.74" W
Ahead       = N  32° 45' 52.05" E
Chord Bear  = N  34° 19' 34.11" W

================================================================================
Ending chain HH1 description


<*      23   Describe Chain HH2

Chain HH2 contains:
 HH210 CUR HH2-1 HH211

Beginning chain HH2 description
================================================================================

Point HH210           N     1,623,866.43 E       542,014.21 Sta     6+69.8934

Course from HH210 to PC HH2-1 S 44° 36' 37.94" E Dist 330.11

                                Curve Data
                               *----------*
Curve HH2-1
P.I.  Station          12+78.9444  N        1,623,432.85  E          542,441.93
Delta       =       8° 19' 13.20" (LT)
Degree      =       1° 29' 38.48"
Tangent     =              278.94
Length      =              556.91
Radius      =            3,835.00
```

```
External    =              10.13
Long Chord  =             556.42
Mid. Ord.   =              10.10
P.C.  Station          10+00.0000  N        1,623,631.43  E          542,246.04
P.T.  Station          15+56.9080  N        1,623,264.71  E          542,664.51
C.C.                               N        1,626,324.69  E          544,976.16
Back        = S  44° 36' 37.94" E
Ahead       = S  52° 55' 51.14" E
Chord Bear  = S  48° 46' 14.54" E

Course from PT HH2-1 to HH211 S 52° 55' 51.14" E Dist 500.87

Point HH211           N     1,622,962.79 E       543,064.15 Sta    20+57.7777

================================================================================
Ending chain HH2 description


<*      24   Describe Chain LL1

Chain LL1 contains:
 LL110 CUR LL1-1 CUR LL1-2 CUR LL1-3 CUR LL1-4 CUR LL1-5

Beginning chain LL1 description
================================================================================

Point LL110           N     1,623,963.17 E       542,047.66 Sta    10+00.0000

Course from LL110 to PC LL1-1 S 47° 27' 21.37" E Dist 630.58

                                Curve Data
                               *----------*
Curve LL1-1
P.I.  Station          17+95.4537  N        1,623,425.32  E          542,633.72
Delta       =       8° 10' 31.20" (LT)
Degree      =       2° 29' 00.82"
Tangent     =              164.87
Length      =              329.18
Radius      =           2,307.00
External    =                5.88
Long Chord  =              328.90
Mid. Ord.   =                5.87
P.C.  Station          16+30.5850  N        1,623,536.79  E          542,512.25
P.T.  Station          19+59.7627  N        1,623,332.25  E          542,769.81
C.C.                               N        1,625,236.49  E          544,072.15
Back        = S  47° 27' 21.37" E
Ahead       = S  55° 37' 52.57" E
Chord Bear  = S  51° 32' 36.97" E

Course from PT LL1-1 to PC LL1-2 S 55° 37' 52.57" E Dist 744.47

                                Curve Data
                               *----------*
Curve LL1-2
P.I.  Station          31+13.6484  N        1,622,680.86  E          543,722.25
Delta       =      44° 31' 48.87" (RT)
Degree      =       5° 43' 46.48"
Tangent     =              409.42
Length      =              777.20
Radius      =           1,000.00
External    =               80.57
Long Chord  =              757.79
Mid. Ord.   =               74.56
P.C.  Station          27+04.2295  N        1,622,911.98  E          543,384.31
P.T.  Station          34+81.4288  N        1,622,279.10  E          543,801.08
C.C.                               N        1,622,086.56  E          542,819.79
Back        = S  55° 37' 52.57" E
Ahead       = S  11° 06' 03.70" E
Chord Bear  = S  33° 21' 58.13" E

Course from PT LL1-2 to PC LL1-3 S 11° 06' 03.70" E Dist 423.20
```

```
                                Curve Data
                               *----------*
Curve LL1-3
P.I.  Station          41+07.5902  N        1,621,664.65  E          543,921.64
Delta       =      19° 36' 01.37" (LT)
Degree      =       4° 52' 34.45"
Tangent     =              202.96
Length      =              401.96
Radius      =            1,175.00
External    =               17.40
Long Chord  =              400.00
Mid. Ord.   =               17.15
P.C.  Station          39+04.6284  N        1,621,863.82  E          543,882.56
P.T.  Station          43+06.5855  N        1,621,490.14  E          544,025.26
C.C.                               N        1,622,090.05  E          545,035.58
Back        = S  11° 06' 03.70" E
Ahead       = S  30° 42' 05.07" E
Chord Bear  = S  20° 54' 04.38" E

Course from PT LL1-3 to PC LL1-4 S 30° 42' 05.07" E Dist 349.86

                                Curve Data
                               *----------*
Curve LL1-4
P.I.  Station          49+87.4386  N        1,620,904.72  E          544,372.88
Delta       =      31° 43' 17.49" (RT)
Degree      =       4° 55' 05.13"
Tangent     =              331.00
Length      =              645.00
Radius      =            1,165.00
External    =               46.11
Long Chord  =              636.79
Mid. Ord.   =               44.35
P.C.  Station          46+56.4420  N        1,621,189.32  E          544,203.89
P.T.  Station          53+01.4385  N        1,620,573.77  E          544,366.99
C.C.                               N        1,620,594.51  E          543,202.17
Back        = S  30° 42' 05.07" E
Ahead       = S   1° 01' 12.42" W
Chord Bear  = S  14° 50' 26.32" E

                                Curve Data
                               *----------*
Curve LL1-5
P.I.  Station          56+74.2110  N        1,620,201.06  E          544,360.35
Delta       =      18° 10' 45.25" (RT)
Degree      =       2° 27' 32.57"
Tangent     =              372.77
Length      =              739.28
Radius      =            2,330.00
External    =               29.63
Long Chord  =              736.18
Mid. Ord.   =               29.26
P.C.  Station          53+01.4385  N        1,620,573.77  E          544,366.99
P.T.  Station          60+40.7184  N        1,619,849.02  E          544,237.76
C.C.                               N        1,620,615.25  E          542,037.36
Back        = S   1° 01' 12.42" W
Ahead       = S  19° 11' 57.67" W
Chord Bear  = S  10° 06' 35.05" W

================================================================================
Ending chain LL1 description


<*      25   Describe Chain ULT-LL1

Chain ULT-LL1 contains:
 CUR ULT-LL1-1 ULL002

Beginning chain ULT-LL1 description
================================================================================
```

```
                                Curve Data
                               *----------*
Curve ULT-LL1-1
P.I.  Station          55+33.7132  N        1,620,341.53  E          544,362.85
Delta       =      22° 33' 04.53" (RT)
Degree      =       4° 55' 05.13"
Tangent     =              232.27
Length      =              458.54
Radius      =           1,165.00
External    =                22.93
Long Chord  =              455.58
Mid. Ord.   =                22.49
P.C.  Station          53+01.4385  N        1,620,573.77  E          544,366.99
P.T.  Station          57+59.9752  N        1,620,128.64  E          544,269.97
C.C.                               N        1,620,594.51  E          543,202.17
Back        = S   1° 01' 12.42" W
Ahead       = S  23° 34' 16.95" W
Chord Bear  = S  12° 17' 44.69" W

Course from PT ULT-LL1-1 to ULL002 S 23° 34' 16.95" W Dist 17.02

Point ULL002          N     1,620,113.04 E       544,263.16 Sta    57+76.9995

================================================================================
Ending chain ULT-LL1 description


<*      26   Describe Chain LL2

Chain LL2 contains:
 LL210 CUR LL2-1 CUR LL2-2 CUR LL2-3 LL211

Beginning chain LL2 description
================================================================================

Point LL210           N     1,623,321.82 E       542,811.63 Sta    10+00.0000

Course from LL210 to PC LL2-1 S 59° 37' 41.79" E Dist 745.27

                                Curve Data
                               *----------*
Curve LL2-1
P.I.  Station          21+64.4687  N        1,622,733.05  E          543,816.29
Delta       =      31° 43' 49.84" (LT)
Degree      =       3° 53' 04.05"
Tangent     =              419.20
Length      =              816.86
Radius      =           1,475.00
External    =                58.41
Long Chord  =              806.46
Mid. Ord.   =                56.19
P.C.  Station          17+45.2707  N        1,622,945.00  E          543,454.62
P.T.  Station          25+62.1285  N        1,622,742.99  E          544,235.37
C.C.                               N        1,624,217.58  E          544,200.39
Back        = S  59° 37' 41.79" E
Ahead       = N  88° 38' 28.37" E
Chord Bear  = S  75° 29' 36.71" E

Course from PT LL2-1 to PC LL2-2 N 88° 38' 28.37" E Dist 224.35

                                Curve Data
                               *----------*
Curve LL2-2
P.I.  Station          29+96.7924  N        1,622,753.30  E          544,669.91
Delta       =      14° 50' 21.47" (RT)
Degree      =       3° 32' 51.81"
Tangent     =              210.32
Length      =              418.28
Radius      =           1,615.00
External    =                13.64
```

```
Long Chord  =              417.11
Mid. Ord.   =               13.52
P.C.  Station          27+86.4774  N        1,622,748.31  E          544,459.66
P.T.  Station          32+04.7536  N        1,622,704.27  E          544,874.43
C.C.                               N        1,621,133.77  E          544,497.95
Back        = N  88° 38' 28.37" E
Ahead       = S  76° 31' 10.16" E
Chord Bear  = S  83° 56' 20.89" E

Course from PT LL2-2 to PC LL2-3 S 76° 31' 10.16" E Dist 431.66

                                Curve Data
                               *----------*
Curve LL2-3
P.I.  Station          42+81.2925  N        1,622,453.31  E          545,921.31
Delta       =      84° 01' 00.51" (LT)
Degree      =       8° 00' 07.93"
Tangent     =              644.88
Length      =            1,049.92
Radius      =              716.00
External    =              247.60
Long Chord  =              958.35
Mid. Ord.   =              183.98
P.C.  Station          36+36.4130  N        1,622,603.65  E          545,294.20
P.T.  Station          46+86.3339  N        1,623,061.34  E          546,136.19
C.C.                               N        1,623,299.92  E          545,461.11
Back        = S  76° 31' 10.16" E
Ahead       = N  19° 27' 49.33" E
Chord Bear  = N  61° 28' 19.59" E

Course from PT LL2-3 to LL211 N 19° 27' 49.33" E Dist 767.88

Point LL211           N     1,623,785.34 E       546,392.06 Sta    54+54.2187

================================================================================
Ending chain LL2 description


<*      27   Describe Chain LL3

Chain LL3 contains:
 LL310 CUR LL3-1 CUR LL3-2 CUR LL3-3 CUR LL3-4

Beginning chain LL3 description
================================================================================

Point LL310           N     1,622,108.28 E       542,652.77 Sta     8+68.8199

Course from LL310 to PC LL3-1 N 85° 39' 14.15" E Dist 218.41

                                Curve Data
                               *----------*
Curve LL3-1
P.I.  Station          12+87.6254  N        1,622,140.02  E          543,070.37
Delta       =       7° 09' 59.92" (RT)
Degree      =       1° 47' 25.78"
Tangent     =              200.39
Length      =              400.26
Radius      =            3,200.00
External    =                6.27
Long Chord  =              400.00
Mid. Ord.   =                6.26
P.C.  Station          10+87.2336  N        1,622,124.84  E          542,870.56
P.T.  Station          14+87.4945  N        1,622,130.16  E          543,270.52
C.C.                               N        1,618,934.04  E          543,113.05
Back        = N  85° 39' 14.15" E
Ahead       = S  87° 10' 45.93" E
Chord Bear  = N  89° 14' 14.11" E

Course from PT LL3-1 to PC LL3-2 S 87° 10' 45.93" E Dist 268.28
```

```
                                Curve Data
                               *----------*
Curve LL3-2
P.I.  Station          20+28.9330  N        1,622,103.52  E          543,811.30
Delta       =      13° 35' 34.07" (LT)
Degree      =       2° 29' 59.34"
Tangent     =              273.16
Length      =              543.75
Radius      =           2,292.00
External    =               16.22
Long Chord  =              542.48
Mid. Ord.   =               16.11
P.C.  Station          17+55.7746  N        1,622,116.96  E          543,538.48
P.T.  Station          22+99.5266  N        1,622,154.57  E          544,079.65
C.C.                               N        1,624,406.18  E          543,651.26
Back        = S  87° 10' 45.93" E
Ahead       = N  79° 13' 39.99" E
Chord Bear  = N  86° 01' 27.03" E

Course from PT LL3-2 to PC LL3-3 N 79° 13' 39.99" E Dist 287.48

                                Curve Data
                               *----------*
Curve LL3-3
P.I.  Station          31+56.8977  N        1,622,314.82  E          544,921.91
Delta       =      11° 18' 45.37" (RT)
Degree      =       0° 59' 44.72"
Tangent     =              569.89
Length      =           1,136.08
Radius      =           5,754.00
External    =              28.15
Long Chord  =           1,134.24
Mid. Ord.   =              28.02
P.C.  Station          25+87.0040  N        1,622,208.30  E          544,362.06
P.T.  Station          37+23.0862  N        1,622,309.44  E          545,491.78
C.C.                               N        1,616,555.70  E          545,437.51
Back        = N  79° 13' 39.99" E
Ahead       = S  89° 27' 34.64" E
Chord Bear  = N  84° 53' 02.68" E

Course from PT LL3-3 to PC LL3-4 S 89° 27' 34.64" E Dist 509.18

                                Curve Data
                               *----------*
Curve LL3-4
P.I.  Station          46+65.7706  N        1,622,300.55  E          546,434.42
Delta       =       6° 29' 45.65" (LT)
Degree      =       0° 45' 00.15"
Tangent     =              433.51
Length      =              866.09
Radius      =           7,639.00
External    =              12.29
Long Chord  =              865.62
Mid. Ord.   =              12.27
P.C.  Station          42+32.2633  N        1,622,304.64  E          546,000.93
P.T.  Station          50+98.3490  N        1,622,345.53  E          546,865.59
C.C.                               N        1,629,943.30  E          546,072.98
Back        = S  89° 27' 34.64" E
Ahead       = N  84° 02' 39.71" E
Chord Bear  = N  87° 17' 32.54" E

================================================================================
Ending chain LL3 description


<*      28   Describe Chain MM1

Chain MM1 contains:
 MM110 CUR MM1-1 CUR MM1-2 MM111 SHIFT  MM112 CUR MM1-3 MM113 MM114 MM115 MM116-
 SHIFT  MM117 CUR MM1-4 CUR MM1-5 CUR MM1-6
```

Beginning chain MM1 description
==========

Point MM110 N 1,618,735.76 E 543,947.07 Sta 10+00.0000

Course from MM110 to PC MM1-1 N 27° 18' 47.52" E Dist 785.74

		Curve Data				
Curve MM1-1						
P.I. Station		20+06.6690	N	1,619,630.19	E	544,408.99
Delta	=	12° 06' 10.31" (RT)				
Degree	=	2° 44' 57.54"				
Tangent	=	220.93				
Length	=	440.21				
Radius	=	2,084.00				
External	=	11.68				
Long Chord	=	439.40				
Mid. Ord.	=	11.61				
P.C. Station		17+85.7402	N	1,619,433.90	E	544,307.61
P.T. Station		22+25.9535	N	1,619,800.87	E	544,549.27
C.C.			N	1,618,477.64	E	546,159.27
Back	= N 27° 18' 47.52" E					
Ahead	= N 39° 24' 57.83" E					
Chord Bear	= N 33° 21' 52.68" E					

Course from PT MM1-1 to PC MM1-2 N 39° 24' 57.83" E Dist 234.97

		Curve Data				
Curve MM1-2						
P.I. Station		27+65.8036	N	1,620,217.94	E	544,892.04
Delta	=	27° 32' 30.14" (LT)				
Degree	=	4° 36' 20.77"				
Tangent	=	304.88				
Length	=	597.98				
Radius	=	1,244.00				
External	=	36.82				
Long Chord	=	592.24				
Mid. Ord.	=	35.76				
P.C. Station		24+60.9188	N	1,619,982.40	E	544,698.46
P.T. Station		30+58.9014	N	1,620,516.30	E	544,954.78
C.C.			N	1,620,772.27	E	543,737.40
Back	= N 39° 24' 57.83" E					
Ahead	= N 11° 52' 27.70" E					
Chord Bear	= N 25° 38' 42.76" E					

Course from PT MM1-2 to MM111 N 11° 52' 27.70" E Dist 191.10

Point MM111 N 1,620,703.31 E 544,994.10 Sta 32+50.0000

----- Shift: 24.00 (LT) at station 32+50.0000

Point MM112 N 1,620,708.25 E 544,970.61 Sta 32+50.0000

Course from MM112 to PC MM1-3 N 11° 52' 27.70" E Dist 177.40

		Curve Data				
Curve MM1-3						
P.I. Station		37+19.0004	N	1,621,167.21	E	545,067.12
Delta	=	12° 02' 25.16" (RT)				
Degree	=	2° 04' 19.85"				
Tangent	=	291.60				
Length	=	581.05				
Radius	=	2,765.00				
External	=	15.33				
Long Chord	=	579.98				
Mid. Ord.	=	15.25				
P.C. Station		34+27.4035	N	1,620,881.85	E	545,007.12
P.T. Station		40+08.4496	N	1,621,433.77	E	545,185.32

```
C.C.                                N        1,620,312.91  E          547,712.95
Back        = N  11° 52' 27.70" E
Ahead       = N  23° 54' 52.85" E
Chord Bear  = N  17° 53' 40.28" E

Course from PT MM1-3 to MM113 N 23° 54' 52.85" E Dist 580.81

Point MM113           N     1,621,964.72 E       545,420.77 Sta    45+89.2621

Course from MM113 to MM116 N 23° 59' 16.07" E Dist 865.56

Point MM116           N     1,622,755.53 E       545,772.66 Sta    54+54.8279

----- Shift: 15.00 (RT) at station 54+54.8279

Point MM117           N     1,622,749.43 E       545,786.36 Sta    54+54.8279

Course from MM117 to PC MM1-4 N 23° 59' 16.07" E Dist 266.47

                                 Curve Data
                                *----------*
Curve MM1-4
P.I.  Station          63+26.2200  N        1,623,545.57  E          546,140.62
Delta       =     122° 20' 08.05" (RT)
Degree      =      17° 12' 21.38"
Tangent     =              604.92
Length      =              711.01
Radius      =              333.00
External    =              357.52
Long Chord  =              583.44
Mid. Ord.   =              172.41
P.C.  Station          57+21.3011  N        1,622,992.89  E          545,894.70
P.T.  Station          64+32.3089  N        1,623,042.17  E          546,476.05
C.C.                                N        1,622,857.51  E          546,198.94
Back        = N  23° 59' 16.07" E
Ahead       = S  33° 40' 35.88" E
Chord Bear  = N  85° 09' 20.09" E

                                 Curve Data
                                *----------*
Curve MM1-5
P.I.  Station          70+37.2278  N        1,622,538.76  E          546,811.48
Delta       =     122° 20' 08.06" (RT)
Degree      =      17° 12' 21.38"
Tangent     =              604.92
Length      =              711.01
Radius      =              333.00
External    =              357.52
Long Chord  =              583.44
Mid. Ord.   =              172.41
P.C.  Station          64+32.3089  N        1,623,042.17  E          546,476.05
P.T.  Station          71+43.3167  N        1,622,524.61  E          546,206.73
C.C.                                N        1,622,857.51  E          546,198.94
Back        = S  33° 40' 35.88" E
Ahead       = S  88° 39' 32.18" W
Chord Bear  = S  27° 29' 28.15" W

Course from PT MM1-5 to PC MM1-6 S 88° 39' 32.18" W Dist 191.95

                                 Curve Data
                                *----------*
Curve MM1-6
P.I.  Station          77+45.2713  N        1,622,510.52  E          545,604.94
Delta       =      10° 13' 19.66" (RT)
Degree      =       1° 14' 59.67"
Tangent     =              410.00
Length      =              817.83
Radius      =            4,584.00
External    =               18.30
Long Chord  =              816.75
Mid. Ord.   =               18.23
```

```
P.C.  Station          73+35.2680  N        1,622,520.11  E          546,014.83
P.T.  Station          81+53.0984  N        1,622,573.82  E          545,199.85
C.C.                               N        1,627,102.86  E          545,907.55
Back        = S  88° 39' 32.18" W
Ahead       = N  81° 07' 08.17" W
Chord Bear  = N  86° 13' 48.00" W

================================================================================
Ending chain MM1 description


<*      29   Describe Chain MM2

Chain MM2 contains:
 MM210 CUR MM2-1 MM211 MM212

Beginning chain MM2 description
================================================================================

Point MM210           N     1,621,533.73 E       545,255.93 Sta    10+00.0000

Course from MM210 to PC MM2-1 N 27° 54' 52.85" E Dist 305.73

                                 Curve Data
                                *----------*
Curve MM2-1
P.I.  Station          17+42.3854  N        1,622,189.74  E          545,603.48
Delta       =      56° 07' 46.86" (RT)
Degree      =       6° 59' 44.96"
Tangent     =              436.66
Length      =              802.33
Radius      =              819.00
External    =              109.13
Long Chord  =              770.63
Mid. Ord.   =               96.30
P.C.  Station          13+05.7258  N        1,621,803.89  E          545,399.06
P.T.  Station          21+08.0573  N        1,622,235.05  E          546,037.79
C.C.                               N        1,621,420.47  E          546,122.77
Back        = N  27° 54' 52.85" E
Ahead       = N  84° 02' 39.71" E
Chord Bear  = N  55° 58' 46.28" E

Course from PT MM2-1 to MM211 N 84° 02' 39.71" E Dist 991.94

Point MM211           N     1,622,337.97 E       547,024.38 Sta    31+00.0000

Course from MM211 to MM212 N 83° 57' 32.21" E Dist 465.28

Point MM212           N     1,622,386.94 E       547,487.08 Sta    35+65.2840

================================================================================
Ending chain MM2 description


<*      30   Describe Chain MM3

Chain MM3 contains:
 MM310 CUR MM3-1 CUR MM3-2 CUR MM3-3 CUR MM3-4 CUR MM3-5 CUR MM3-6

Beginning chain MM3 description
================================================================================

Point MM310           N     1,623,026.45 E       545,871.32 Sta    10+00.0000

Course from MM310 to PC MM3-1 N 27° 59' 16.07" E Dist 407.23

                                 Curve Data
                                *----------*
Curve MM3-1
P.I.  Station          16+07.5591  N        1,623,562.96  E          546,156.44
Delta       =       7° 59' 57.88" (RT)
```

```
Degree      =       1° 59' 59.47"
Tangent     =              200.33
Length      =              400.00
Radius      =           2,865.00
External    =                7.00
Long Chord  =              399.68
Mid. Ord.   =                6.98
P.C.  Station          14+07.2336  N        1,623,386.06  E          546,062.43
P.T.  Station          18+07.2336  N        1,623,725.05  E          546,274.15
C.C.                               N        1,622,041.56  E          548,592.36
Back        = N  27° 59' 16.07" E
Ahead       = N  35° 59' 13.94" E
Chord Bear  = N  31° 59' 15.01" E

Course from PT MM3-1 to PC MM3-2 N 35° 59' 13.94" E Dist 200.00

                                Curve Data
                               *----------*
Curve MM3-2
P.I.  Station          24+16.2145  N        1,624,217.81  E          546,631.99
Delta       =      17° 20' 31.36" (LT)
Degree      =       2° 08' 11.36"
Tangent     =              408.98
Length      =              811.71
Radius      =           2,681.77
External    =               31.01
Long Chord  =              808.61
Mid. Ord.   =               30.65
P.C.  Station          20+07.2336  N        1,623,886.88  E          546,391.67
P.T.  Station          28+18.9411  N        1,624,605.32  E          546,762.75
C.C.                               N        1,625,462.70  E          544,221.72
Back        = N  35° 59' 13.94" E
Ahead       = N  18° 38' 42.59" E
Chord Bear  = N  27° 18' 58.27" E

Course from PT MM3-2 to PC MM3-3 N 18° 38' 42.59" E Dist 170.00

                                Curve Data
                               *----------*
Curve MM3-3
P.I.  Station          32+38.5186  N        1,625,002.88  E          546,896.89
Delta       =       5° 21' 48.41" (RT)
Degree      =       1° 04' 31.05"
Tangent     =              249.58
Length      =              498.79
Radius      =           5,328.40
External    =                5.84
Long Chord  =              498.61
Mid. Ord.   =                5.84
P.C.  Station          29+88.9411  N        1,624,766.40  E          546,817.10
P.T.  Station          34+87.7316  N        1,625,230.86  E          546,998.43
C.C.                               N        1,623,062.88  E          551,865.84
Back        = N  18° 38' 42.59" E
Ahead       = N  24° 00' 31.00" E
Chord Bear  = N  21° 19' 36.79" E

                                Curve Data
                               *----------*
Curve MM3-4
P.I.  Station          36+39.3719  N        1,625,369.38  E          547,060.13
Delta       =       0° 45' 24.71" (LT)
Degree      =       0° 14' 58.42"
Tangent     =              151.64
Length      =              303.28
Radius      =          22,958.50
External    =                0.50
Long Chord  =              303.27
Mid. Ord.   =                0.50
P.C.  Station          34+87.7316  N        1,625,230.86  E          546,998.43
P.T.  Station          37+91.0078  N        1,625,508.71  E          547,120.00
C.C.                               N        1,634,572.08  E          526,026.20
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```
Back        = N  24° 00' 31.00" E
Ahead       = N  23° 15' 06.29" E
Chord Bear  = N  23° 37' 48.64" E

Course from PT MM3-4 to PC MM3-5 N 23° 15' 06.29" E Dist 1,067.04

                                Curve Data
                               *----------*
Curve MM3-5
P.I.  Station          50+23.7126  N        1,626,641.29  E          547,606.63
Delta       =       0° 40' 44.78" (RT)
Degree      =       0° 12' 17.89"
Tangent     =              165.66
Length      =              331.32
Radius      =           27,953.50
External    =                0.49
Long Chord  =              331.32
Mid. Ord.   =                0.49
P.C.  Station          48+58.0493  N        1,626,489.08  E          547,541.23
P.T.  Station          51+89.3720  N        1,626,792.71  E          547,673.83
C.C.                               N        1,615,453.83  E          573,224.33
Back        = N  23° 15' 06.29" E
Ahead       = N  23° 55' 51.07" E
Chord Bear  = N  23° 35' 28.68" E

                                Curve Data
                               *----------*
Curve MM3-6
P.I.  Station          53+78.8078  N        1,626,965.87  E          547,750.67
Delta       =       7° 33' 57.09" (RT)
Degree      =       1° 59' 59.47"
Tangent     =              189.44
Length      =              378.32
Radius      =            2,865.00
External    =                6.26
Long Chord  =              378.05
Mid. Ord.   =                6.24
P.C.  Station          51+89.3720  N        1,626,792.71  E          547,673.83
P.T.  Station          55+67.6928  N        1,627,127.39  E          547,849.64
C.C.                               N        1,625,630.57  E          550,292.54
Back        = N  23° 55' 51.07" E
Ahead       = N  31° 29' 48.16" E
Chord Bear  = N  27° 42' 49.62" E

================================================================================
Ending chain MM3 description


<*      31   Describe Chain NN1

Chain NN1 contains:
 CUR NN1-1 CUR NN1-2 CUR NN1-3 CUR NN1-4 CUR NN1-5

Beginning chain NN1 description
================================================================================

                                Curve Data
                               *----------*
Curve NN1-1
P.I.  Station          12+28.9244  N        1,626,717.77  E          547,588.88
Delta       =       0° 56' 12.71" (LT)
Degree      =       0° 12' 16.66"
Tangent     =              228.92
Length      =              457.84
Radius      =           28,000.00
External    =                0.94
Long Chord  =              457.83
Mid. Ord.   =                0.94
P.C.  Station          10+00.0000  N        1,626,926.60  E          547,682.68
P.T.  Station          14+57.8385  N        1,626,507.44  E          547,498.51
C.C.                               N        1,615,453.83  E          573,224.33
```

Back = S 24° 11' 19.00" W
Ahead = S 23° 15' 06.29" W
Chord Bear = S 23° 43' 12.65" W

Course from PT NN1-1 to PC NN1-2 S 23° 15' 06.29" W Dist 1,067.04

Curve Data

Curve NN1-2
P.I. Station = 26+97.5068 N 1,625,368.46 E 547,009.12
Delta = 0° 51' 48.08" (RT)
Degree = 0° 15' 00.25"
Tangent = 172.63
Length = 345.25
Radius = 22,912.00
External = 0.65
Long Chord = 345.24
Mid. Ord. = 0.65
P.C. Station = 25+24.8800 N 1,625,527.07 E 547,077.27
P.T. Station = 28+70.1270 N 1,625,210.90 E 546,938.59
C.C. N 1,634,572.08 E 526,026.20
Back = S 23° 15' 06.29" W
Ahead = S 24° 06' 54.37" W
Chord Bear = S 23° 41' 00.33" W

Curve Data

Curve NN1-3
P.I. Station = 31+43.8521 N 1,624,961.06 E 546,826.76
Delta = 5° 28' 11.78" (LT)
Degree = 0° 59' 59.73"
Tangent = 273.73
Length = 547.03
Radius = 5,730.00
External = 6.53
Long Chord = 546.83
Mid. Ord. = 6.53
P.C. Station = 28+70.1270 N 1,625,210.90 E 546,938.59
P.T. Station = 34+17.1612 N 1,624,701.70 E 546,739.25
C.C. N 1,622,869.79 E 552,168.52
Back = S 24° 06' 54.37" W
Ahead = S 18° 38' 42.59" W
Chord Bear = S 21° 22' 48.48" W

Course from PT NN1-3 to PC NN1-4 S 18° 38' 42.59" W Dist 1,189.24

Curve Data

Curve NN1-4
P.I. Station = 55+85.4521 N 1,622,647.21 E 546,046.03
Delta = 107° 38' 32.20" (LT)
Degree = 8° 00' 07.93"
Tangent = 979.05
Length = 1,345.16
Radius = 716.00
External = 496.93
Long Chord = 1,155.88
Mid. Ord. = 293.34
P.C. Station = 46+06.4045 N 1,623,574.88 E 546,359.04
P.T. Station = 59+51.5624 N 1,622,630.08 E 547,024.93
C.C. N 1,623,345.97 E 547,037.46
Back = S 18° 38' 42.59" W
Ahead = S 88° 59' 49.61" E
Chord Bear = S 35° 10' 33.51" E

Course from PT NN1-4 to PC NN1-5 S 88° 59' 49.61" E Dist 502.97

Curve Data

Curve NN1-5
P.I. Station = 70+76.7610 N 1,622,610.38 E 548,149.95

```
Delta       =      12° 23' 42.40" (LT)
Degree      =       0° 59' 59.73"
Tangent     =             622.23
Length      =           1,239.60
Radius      =           5,730.00
External    =              33.69
Long Chord  =           1,237.19
Mid. Ord.   =              33.49
P.C.  Station          64+54.5311  N        1,622,621.27  E          547,527.82
P.T.  Station          76+94.1336  N        1,622,733.29  E          548,759.92
C.C.                               N        1,628,350.39  E          547,628.11
Back        = S  88° 59' 49.61" E
Ahead       = N  78° 36' 27.99" E
Chord Bear  = N  84° 48' 19.19" E

================================================================================
Ending chain NN1 description


<*      32   Describe Chain NN2

Chain NN2 contains:
 CUR NN2-1 CUR NN2-2 CUR NN2-3 CUR NN2-4 CUR NN2-5 NN211

Beginning chain NN2 description
================================================================================

                                 Curve Data
                                *----------*
Curve NN2-1
P.I.  Station          10+84.1843  N        1,621,535.20  E          544,026.42
Delta       =      13° 24' 41.84" (RT)
Degree      =       8° 00' 07.93"
Tangent     =              84.18
Length      =             167.60
Radius      =             716.00
External    =               4.93
Long Chord  =             167.22
Mid. Ord.   =               4.90
P.C.  Station          10+00.0000  N        1,621,462.82  E          544,069.40
P.T.  Station          11+67.5991  N        1,621,615.58  E          544,001.40
C.C.                               N        1,621,828.38  E          544,685.04
Back        = N  30° 42' 05.07" W
Ahead       = N  17° 17' 23.23" W
Chord Bear  = N  23° 59' 44.15" W

                                 Curve Data
                                *----------*
Curve NN2-2
P.I.  Station          17+73.7406  N        1,622,194.34  E          543,821.25
Delta       =     100° 57' 43.34" (RT)
Degree      =      11° 27' 32.81"
Tangent     =             606.14
Length      =             881.06
Radius      =             500.00
External    =             285.75
Long Chord  =             771.42
Mid. Ord.   =             181.83
P.C.  Station          11+67.5991  N        1,621,615.58  E          544,001.40
P.T.  Station          20+48.6623  N        1,622,261.14  E          544,423.70
C.C.                               N        1,621,764.19  E          544,478.81
Back        = N  17° 17' 23.23" W
Ahead       = N  83° 40' 20.11" E
Chord Bear  = N  33° 11' 28.44" E

Course from PT NN2-2 to PC NN2-3 N 83° 40' 20.11" E Dist 294.81

                                 Curve Data
                                *----------*
Curve NN2-3
P.I.  Station          26+87.3205  N        1,622,331.53  E          545,058.47
```

```
Delta       =       6° 52' 05.26" (RT)
Degree      =       0° 59' 59.73"
Tangent     =              343.84
Length      =              686.86
Radius      =           5,730.00
External    =               10.31
Long Chord  =              686.45
Mid. Ord.   =               10.29
P.C.  Station          23+43.4771  N        1,622,293.64  E          544,716.72
P.T.  Station          30+30.3404  N        1,622,328.29  E          545,402.29
C.C.                               N        1,616,598.54  E          545,348.25
Back        = N  83° 40' 20.11" E
Ahead       = S  89° 27' 34.64" E
Chord Bear  = N  87° 06' 22.74" E

Course from PT NN2-3 to PC NN2-4 S 89° 27' 34.64" E Dist 643.21

                                Curve Data
                               *----------*
Curve NN2-4
P.I.  Station          38+82.1520  N        1,622,320.26  E          546,254.07
Delta       =      16° 24' 25.09" (LT)
Degree      =       3° 57' 34.65"
Tangent     =              208.61
Length      =              414.36
Radius      =           1,447.00
External    =               14.96
Long Chord  =              412.94
Mid. Ord.   =               14.81
P.C.  Station          36+73.5463  N        1,622,322.22  E          546,045.47
P.T.  Station          40+87.9029  N        1,622,377.29  E          546,454.73
C.C.                               N        1,623,769.16  E          546,059.12
Back        = S  89° 27' 34.64" E
Ahead       = N  74° 08' 00.28" E
Chord Bear  = N  82° 20' 12.82" E

Course from PT NN2-4 to PC NN2-5 N 74° 08' 00.28" E Dist 393.47

                                Curve Data
                               *----------*
Curve NN2-5
P.I.  Station          47+31.6630  N        1,622,553.29  E          547,073.96
Delta       =      12° 27' 51.72" (RT)
Degree      =       2° 29' 59.34"
Tangent     =              250.29
Length      =              498.61
Radius      =           2,292.00
External    =               13.63
Long Chord  =              497.63
Mid. Ord.   =               13.55
P.C.  Station          44+81.3694  N        1,622,484.86  E          546,833.20
P.T.  Station          49+79.9807  N        1,622,568.14  E          547,323.81
C.C.                               N        1,620,280.18  E          547,459.83
Back        = N  74° 08' 00.28" E
Ahead       = N  86° 35' 51.99" E
Chord Bear  = N  80° 21' 56.14" E

Course from PT NN2-5 to NN211 N 86° 35' 51.99" E Dist 646.91

Point NN211           N     1,622,606.54 E       547,969.58 Sta    56+26.8913

================================================================================
Ending chain NN2 description


<*      33   Describe Chain OO1

Chain OO1 contains:
 OO1133 CUR OO1-1 CUR OO1-2 CUR OO1-3 CUR OO1-4 OO1134 CUR OO1-5 CUR OO1-6 CUR -
OO1-7 OO1135 OO1136
```

Beginning chain OO1 description
==========

Point OO1133 N 1,618,747.30 E 543,721.46 Sta 133+14.5585

Course from OO1133 to PC OO1-1 N 24° 03' 25.00" E Dist 100.00

Curve Data

Curve OO1-1					
P.I. Station	136+35.2482	N	1,619,040.14	E	543,852.18
Delta =	8° 44' 11.91" (LT)				
Degree =	1° 58' 59.66"				
Tangent =	220.69				
Length =	440.52				
Radius =	2,889.00				
External =	8.42				
Long Chord =	440.10				
Mid. Ord. =	8.39				
P.C. Station	134+14.5585	N	1,618,838.62	E	543,762.22
P.T. Station	138+55.0823	N	1,619,252.98	E	543,910.49
C.C.		N	1,620,016.30	E	541,124.16
Back = N	24° 03' 25.00" E				
Ahead = N	15° 19' 13.09" E				
Chord Bear = N	19° 41' 19.05" E				

Course from PT OO1-1 to PC OO1-2 N 15° 19' 13.09" E Dist 226.84

Curve Data

Curve OO1-2					
P.I. Station	142+81.9699	N	1,619,664.70	E	544,023.28
Delta =	5° 29' 35.04" (RT)				
Degree =	1° 22' 26.40"				
Tangent =	200.05				
Length =	399.79				
Radius =	4,170.00				
External =	4.80				
Long Chord =	399.63				
Mid. Ord. =	4.79				
P.C. Station	140+81.9233	N	1,619,471.76	E	543,970.43
P.T. Station	144+81.7100	N	1,619,851.69	E	544,094.36
C.C.		N	1,618,369.99	E	547,992.24
Back = N	15° 19' 13.09" E				
Ahead = N	20° 48' 48.14" E				
Chord Bear = N	18° 04' 00.62" E				

Curve Data

Curve OO1-3					
P.I. Station	151+12.9076	N	1,620,441.70	E	544,318.64
Delta =	8° 39' 22.14" (RT)				
Degree =	0° 41' 13.20"				
Tangent =	631.20				
Length =	1,259.99				
Radius =	8,340.00				
External =	23.85				
Long Chord =	1,258.80				
Mid. Ord. =	23.78				
P.C. Station	144+81.7100	N	1,619,851.69	E	544,094.36
P.T. Station	157+41.7031	N	1,620,991.23	E	544,629.17
C.C.		N	1,616,888.28	E	551,890.12
Back = N	20° 48' 48.14" E				
Ahead = N	29° 28' 10.27" E				
Chord Bear = N	25° 08' 29.21" E				

Curve Data

Curve OO1-4					
P.I. Station	162+80.4418	N	1,621,460.27	E	544,894.21
Delta =	5° 21' 59.98" (LT)				

```
Degree      =       0° 29' 54.39"
Tangent     =              538.74
Length      =           1,076.69
Radius      =          11,495.00
External    =              12.62
Long Chord  =           1,076.30
Mid. Ord.   =              12.60
P.C.  Station         157+41.7031  N        1,620,991.23  E          544,629.17
P.T.  Station         168+18.3928  N        1,621,952.04  E          545,114.21
C.C.                               N        1,626,646.32  E          534,621.42
Back        = N  29° 28' 10.27" E
Ahead       = N  24° 06' 10.29" E
Chord Bear  = N  26° 47' 10.28" E

Course from PT OO1-4 to OO1134 N 24° 06' 10.29" E Dist 1,455.32

Point OO1134          N     1,623,280.47 E       545,708.53 Sta   182+73.7118

Course from OO1134 to PC OO1-5 N 24° 06' 10.29" E Dist 1,316.99

                                Curve Data
                               *----------*
Curve OO1-5
P.I.  Station         198+07.3159  N        1,624,680.37  E          546,334.82
Delta       =       1° 04' 47.35" (RT)
Degree      =       0° 14' 57.31"
Tangent     =              216.62
Length      =              433.22
Radius      =          22,987.00
External    =                1.02
Long Chord  =              433.22
Mid. Ord.   =                1.02
P.C.  Station         195+90.6985  N        1,624,482.64  E          546,246.36
P.T.  Station         200+23.9204  N        1,624,876.40  E          546,426.99
C.C.                               N        1,615,095.30  E          567,229.21
Back        = N  24° 06' 10.29" E
Ahead       = N  25° 10' 57.64" E
Chord Bear  = N  24° 38' 33.96" E

Course from PT OO1-5 to PC OO1-6 N 25° 10' 57.64" E Dist 426.54

                                Curve Data
                               *----------*
Curve OO1-6
P.I.  Station         207+28.7308  N        1,625,514.22  E          546,726.89
Delta       =       2° 48' 51.83" (RT)
Degree      =       0° 30' 20.84"
Tangent     =              278.27
Length      =              556.44
Radius      =          11,328.02
External    =                3.42
Long Chord  =              556.38
Mid. Ord.   =                3.42
P.C.  Station         204+50.4560  N        1,625,262.39  E          546,608.48
P.T.  Station         210+06.8937  N        1,625,759.93  E          546,857.52
C.C.                               N        1,620,442.26  E          556,859.84
Back        = N  25° 10' 57.64" E
Ahead       = N  27° 59' 49.47" E
Chord Bear  = N  26° 35' 23.55" E

                                Curve Data
                               *----------*
Curve OO1-7
P.I.  Station         211+28.4520  N        1,625,867.26  E          546,914.58
Delta       =       1° 13' 46.59" (RT)
Degree      =       0° 30' 20.84"
Tangent     =              121.56
Length      =              243.11
Radius      =          11,328.02
External    =                0.65
Long Chord  =              243.10
```

```
Mid. Ord.   =               0.65
P.C.  Station         210+06.8937  N        1,625,759.93  E          546,857.52
P.T.  Station         212+50.0010  N        1,625,973.34  E          546,973.94
C.C.                               N        1,620,442.26  E          556,859.84
Back        = N  27° 59' 49.47" E
Ahead       = N  29° 13' 36.06" E
Chord Bear  = N  28° 36' 42.76" E

Course from PT OO1-7 to OO1135 N 60° 50' 39.11" W Dist 24.00

Point OO1135          N     1,625,985.04 E       546,952.98 Sta   212+74.0044

Course from OO1135 to OO1136 N 29° 10' 57.64" E Dist 239.99

Point OO1136          N     1,626,194.57 E       547,069.99 Sta   215+13.9956

================================================================================
Ending chain OO1 description


<*      34   Describe Chain ULT-LL1

Chain ULT-LL1 contains:
 CUR ULT-LL1-1 ULL002

Beginning chain ULT-LL1 description
================================================================================

                                Curve Data
                               *----------*
Curve ULT-LL1-1
P.I.  Station          55+33.7132  N        1,620,341.53  E          544,362.85
Delta       =      22° 33' 04.53" (RT)
Degree      =       4° 55' 05.13"
Tangent     =              232.27
Length      =              458.54
Radius      =            1,165.00
External    =               22.93
Long Chord  =              455.58
Mid. Ord.   =               22.49
P.C.  Station          53+01.4385  N        1,620,573.77  E          544,366.99
P.T.  Station          57+59.9752  N        1,620,128.64  E          544,269.97
C.C.                               N        1,620,594.51  E          543,202.17
Back        = S   1° 01' 12.42" W
Ahead       = S  23° 34' 16.95" W
Chord Bear  = S  12° 17' 44.69" W

Course from PT ULT-LL1-1 to ULL002 S 23° 34' 16.95" W Dist 17.02

Point ULL002          N     1,620,113.04 E       544,263.16 Sta    57+76.9995

================================================================================
Ending chain ULT-LL1 description


<*      35   Describe Chain OO2

Chain OO2 contains:
 CUR OO2-1 CUR OO2-2 CUR OO2-3 OO211 OO212 CUR OO2-4 OO213

Beginning chain OO2 description
================================================================================

                                Curve Data
                               *----------*
Curve OO2-1
P.I.  Station          12+68.3019  N        1,626,005.84  E          546,933.50
Delta       =       3° 02' 16.21" (LT)
Degree      =       0° 33' 58.52"
Tangent     =              268.30
Length      =              536.48
```

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Radius      =           10,118.36
External    =                3.56
Long Chord  =              536.42
Mid. Ord.   =                3.56
P.C.  Station          10+00.0000  N        1,625,768.77  E          546,807.87
P.T.  Station          15+36.4780  N        1,626,249.24  E          547,046.38
C.C.                               N        1,630,506.42  E          537,867.19
Back        = N  27° 55' 08.48" E
Ahead       = N  24° 52' 52.26" E
Chord Bear  = N  26° 24' 00.37" E

                                Curve Data
                               *----------*
Curve OO2-2
P.I.  Station          18+19.2179  N        1,626,505.74  E          547,165.34
Delta       =       2° 49' 36.57" (LT)
Degree      =       0° 30' 00.00"
Tangent     =              282.74
Length      =              565.37
Radius      =           11,459.16
External    =                3.49
Long Chord  =              565.31
Mid. Ord.   =                3.49
P.C.  Station          15+36.4780  N        1,626,249.24  E          547,046.38
P.T.  Station          21+01.8431  N        1,626,767.79  E          547,271.51
C.C.                               N        1,631,070.54  E          536,650.84
Back        = N  24° 52' 52.26" E
Ahead       = N  22° 03' 15.69" E
Chord Bear  = N  23° 28' 03.98" E

                                Curve Data
                               *----------*
Curve OO2-3
P.I.  Station          23+02.1186  N        1,626,953.41  E          547,346.71
Delta       =       2° 00' 09.18" (RT)
Degree      =       0° 30' 00.00"
Tangent     =              200.28
Length      =              400.51
Radius      =           11,459.16
External    =                1.75
Long Chord  =              400.49
Mid. Ord.   =                1.75
P.C.  Station          21+01.8431  N        1,626,767.79  E          547,271.51
P.T.  Station          25+02.3532  N        1,627,136.29  E          547,428.35
C.C.                               N        1,622,465.04  E          557,892.17
Back        = N  22° 03' 15.69" E
Ahead       = N  24° 03' 24.87" E
Chord Bear  = N  23° 03' 20.28" E

Course from PT OO2-3 to OO211 N 24° 03' 24.87" E Dist 177.48

Point OO211           N     1,627,298.36 E       547,500.70 Sta    26+79.8361

Course from OO211 to OO212 N 24° 03' 24.87" E Dist 144.12

Point OO212           N     1,627,429.96 E       547,559.45 Sta    28+23.9607

Course from OO212 to PC OO2-4 N 23° 12' 23.75" E Dist 131.55

                                Curve Data
                               *----------*
Curve OO2-4
P.I.  Station          31+83.1644  N        1,627,760.11  E          547,700.99
Delta       =     113° 14' 21.70" (LT)
Degree      =      38° 11' 49.87"
Tangent     =              227.66
Length      =              296.46
Radius      =              150.00
External    =              122.63
Long Chord  =              250.51
Mid. Ord.   =               67.47
```

```
P.C.  Station          29+55.5073  N        1,627,550.87  E          547,611.29
P.T.  Station          32+51.9673  N        1,627,759.98  E          547,473.34
C.C.                               N        1,627,609.98  E          547,473.42
Back        = N  23° 12' 23.75" E
Ahead       = S  89° 58' 02.05" W
Chord Bear  = N  33° 24' 47.10" W

Course from PT OO2-4 to OO213 S 89° 58' 02.05" W Dist 59.15

Point OO213           N     1,627,759.94 E       547,414.19 Sta    33+11.1179

================================================================================
Ending chain OO2 description


<*      36   Describe Chain OO3

Chain OO3 contains:
 CUR OO3-1 CUR OO3-2 CUR OO3-3

Beginning chain OO3 description
================================================================================

                                Curve Data
                               *----------*
Curve OO3-1
P.I.  Station          22+99.7333  N        1,623,098.94  E          543,219.55
Delta       =      31° 39' 35.94" (LT)
Degree      =       1° 14' 59.67"
Tangent     =            1,299.73
Length      =            2,532.99
Radius      =            4,584.00
External    =              180.70
Long Chord  =            2,500.88
Mid. Ord.   =              173.85
P.C.  Station          10+00.0000  N        1,623,953.34  E          542,240.10
P.T.  Station          35+32.9852  N        1,622,885.80  E          544,501.69
C.C.                               N        1,627,407.74  E          545,253.43
Back        = S  48° 54' 04.66" E
Ahead       = S  80° 33' 40.59" E
Chord Bear  = S  64° 43' 52.63" E

                                Curve Data
                               *----------*
Curve OO3-2
P.I.  Station          41+60.0421  N        1,622,782.97  E          545,120.26
Delta       =      66° 34' 41.27" (LT)
Degree      =       5° 59' 58.41"
Tangent     =              627.06
Length      =            1,109.72
Radius      =              955.00
External    =              187.46
Long Chord  =            1,048.33
Mid. Ord.   =              156.70
P.C.  Station          35+32.9852  N        1,622,885.80  E          544,501.69
P.T.  Station          46+42.7024  N        1,623,309.69  E          545,460.49
C.C.                               N        1,623,827.87  E          544,658.30
Back        = S  80° 33' 40.59" E
Ahead       = N  32° 51' 38.14" E
Chord Bear  = N  66° 08' 58.77" E

Course from PT OO3-2 to PC OO3-3 N 32° 51' 38.14" E Dist 952.08

                                Curve Data
                               *----------*
Curve OO3-3
P.I.  Station          58+84.7082  N        1,624,352.97  E          546,134.40
Delta       =       8° 26' 41.07" (LT)
Degree      =       1° 27' 32.48"
Tangent     =              289.92
Length      =              578.79
```

```
Radius      =            3,927.00
External    =               10.69
Long Chord  =              578.27
Mid. Ord.   =               10.66
P.C.  Station          55+94.7858  N        1,624,109.43  E          545,977.09
P.T.  Station          61+73.5806  N        1,624,616.96  E          546,254.24
C.C.                               N        1,626,240.21  E          542,678.44
Back        = N  32° 51' 38.14" E
Ahead       = N  24° 24' 57.07" E
Chord Bear  = N  28° 38' 17.60" E

================================================================================
Ending chain OO3 description


<*      37   Describe Chain OO4

Chain OO4 contains:
 CUR OO4-1 CUR OO4-2 CUR OO4-3 CUR OO4-4

Beginning chain OO4 description
================================================================================

                                Curve Data
                               *----------*
Curve OO4-1
P.I.  Station           7+85.0284  N        1,621,775.36  E          544,982.59
Delta       =       2° 09' 08.11" (RT)
Degree      =       0° 30' 01.91"
Tangent     =              215.02
Length      =              429.99
Radius      =           11,447.00
External    =                2.02
Long Chord  =              429.97
Mid. Ord.   =                2.02
P.C.  Station           5+70.0062  N        1,621,971.64  E          545,070.40
P.T.  Station          10+00.0000  N        1,621,582.52  E          544,887.47
C.C.                               N        1,626,646.32  E          534,621.42
Back        = S  24° 06' 10.29" W
Ahead       = S  26° 15' 18.40" W
Chord Bear  = S  25° 10' 44.35" W

Course from PT OO4-1 to PC OO4-2 S 30° 28' 00.75" W Dist 68.31

                                Curve Data
                               *----------*
Curve OO4-2
P.I.  Station          16+82.0150  N        1,620,994.68  E          544,541.66
Delta       =     111° 13' 38.02" (RT)
Degree      =      13° 38' 30.67"
Tangent     =              613.71
Length      =              815.34
Radius      =              420.00
External    =              323.66
Long Chord  =              693.21
Mid. Ord.   =              182.80
P.C.  Station          10+68.3077  N        1,621,523.65  E          544,852.84
P.T.  Station          18+83.6458  N        1,621,476.26  E          544,161.25
C.C.                               N        1,621,736.60  E          544,490.83
Back        = S  30° 28' 00.75" W
Ahead       = N  38° 18' 21.23" W
Chord Bear  = S  86° 04' 49.76" W

                                Curve Data
                               *----------*
Curve OO4-3
P.I.  Station          24+97.3531  N        1,621,957.85  E          543,780.84
Delta       =     111° 13' 38.02" (RT)
Degree      =      13° 38' 30.67"
Tangent     =              613.71
Length      =              815.34
```

```
Radius      =              420.00
External    =              323.66
Long Chord  =              693.21
Mid. Ord.   =              182.80
P.C.  Station          18+83.6458  N        1,621,476.26  E          544,161.25
P.T.  Station          26+98.9840  N        1,622,138.08  E          544,367.48
C.C.                               N        1,621,736.60  E          544,490.83
Back        = N  38° 18' 21.23" W
Ahead       = N  72° 55' 16.79" E
Chord Bear  = N  17° 18' 27.78" E

                                Curve Data
                               *----------*
Curve OO4-4
P.I.  Station          31+24.6394  N        1,622,263.09  E          544,774.37
Delta       =      14° 41' 58.56" (RT)
Degree      =       1° 44' 10.45"
Tangent     =              425.66
Length      =              846.64
Radius      =            3,300.00
External    =               27.34
Long Chord  =              844.32
Mid. Ord.   =               27.11
P.C.  Station          26+98.9840  N        1,622,138.08  E          544,367.48
P.T.  Station          35+45.6202  N        1,622,280.76  E          545,199.65
C.C.                               N        1,618,983.61  E          545,336.64
Back        = N  72° 55' 16.79" E
Ahead       = N  87° 37' 15.35" E
Chord Bear  = N  80° 16' 16.07" E

================================================================================
Ending chain OO4 description


<*      38   Describe Chain RR

Chain RR contains:
 CUR RR-1 CUR RR-2

Beginning chain RR description
================================================================================

                                Curve Data
                               *----------*
Curve RR-1
P.I.  Station          12+58.5113  N        1,623,060.84  E          550,703.13
Delta       =       5° 13' 43.30" (RT)
Degree      =       1° 00' 43.24"
Tangent     =              258.51
Length      =              516.66
Radius      =            5,661.58
External    =                5.90
Long Chord  =              516.48
Mid. Ord.   =                5.89
P.C.  Station          10+00.0000  N        1,623,019.86  E          550,447.89
P.T.  Station          15+16.6638  N        1,623,078.38  E          550,961.05
C.C.                               N        1,617,429.85  E          551,345.24
Back        = N  80° 52' 48.78" E
Ahead       = N  86° 06' 32.08" E
Chord Bear  = N  83° 29' 40.43" E

                                Curve Data
                               *----------*
Curve RR-2
P.I.  Station          16+85.5992  N        1,623,089.84  E          551,129.59
Delta       =      70° 30' 30.94" (RT)
Degree      =      23° 58' 23.27"
Tangent     =              168.94
Length      =              294.12
Radius      =              239.00
External    =               53.68
```

```
Long Chord  =              275.90
Mid. Ord.   =               43.83
P.C.  Station          15+16.6638  N        1,623,078.38  E          550,961.05
P.T.  Station          18+10.7789  N        1,622,934.78  E          551,196.64
C.C.                               N        1,622,839.93  E          550,977.27
Back        = N  86° 06' 32.08" E
Ahead       = S  23° 22' 56.98" E
Chord Bear  = S  58° 38' 12.45" E

================================================================================
Ending chain RR description


<*      39   Describe Chain CR46AEB

Chain CR46AEB contains:
 CR4610 CUR CR46AEB-1 CUR CR46AEB-2

Beginning chain CR46AEB description
================================================================================

Point CR4610          N     1,620,119.85 E       544,692.98 Sta     4+68.1284

Course from CR4610 to PC CR46AEB-1 N 16° 39' 02.40" E Dist 55.52

                                Curve Data
                               *----------*
Curve CR46AEB-1
P.I.  Station           7+16.8746  N        1,620,358.17  E          544,764.25
Delta       =       1° 55' 55.54" (RT)
Degree      =       0° 30' 00.02"
Tangent     =              193.23
Length      =              386.41
Radius      =          11,459.00
External    =                1.63
Long Chord  =              386.40
Mid. Ord.   =                1.63
P.C.  Station           5+23.6495  N        1,620,173.04  E          544,708.89
P.T.  Station           9+10.0632  N        1,620,541.32  E          544,825.83
C.C.                               N        1,616,889.63  E          555,687.41
Back        = N  16° 39' 02.40" E
Ahead       = N  18° 34' 57.94" E
Chord Bear  = N  17° 37' 00.17" E

Course from PT CR46AEB-1 to PC CR46AEB-2 N 18° 34' 57.94" E Dist 407.13

                                Curve Data
                               *----------*
Curve CR46AEB-2
P.I.  Station          16+29.7642  N        1,621,223.50  E          545,055.18
Delta       =       6° 40' 51.84" (RT)
Degree      =       1° 04' 11.82"
Tangent     =              312.57
Length      =              624.43
Radius      =           5,355.00
External    =                9.11
Long Chord  =              624.07
Mid. Ord.   =                9.10
P.C.  Station          13+17.1958  N        1,620,927.22  E          544,955.57
P.T.  Station          19+41.6242  N        1,621,506.17  E          545,188.58
C.C.                               N        1,619,220.72  E          550,031.38
Back        = N  18° 34' 57.94" E
Ahead       = N  25° 15' 49.78" E
Chord Bear  = N  21° 55' 23.86" E

================================================================================
Ending chain CR46AEB description


<*         Output Section8-Chains
```

Output file SECTION8-CHAINS is stored

Section 4 – Vertical Geometry

Project: Wekiva Section 8
Job No. 429
Operator: RD
Date: Friday March 25, 2016

<*   1   Print Profile 429_A1

Beginning profile 429_A1 description:
==========

	STATION	ELEV	GRADE	TOTAL L	BACK L	AHEAD L
Beginning Region = 2						
VPI 1	1114+87.2533	98.720				
VPC	1127+00.0000	88.044	-0.880	K = 373.1		
Low Point	1130+28.4338	86.599				
VPI 2	1132+00.0000	83.643		1,000.000	500.000	500.000
VPT	1137+00.0000	92.643	1.800			
VPC	1137+10.0000	92.823	1.800	K = 617.8	SSD = 1154.6	
VPI 3	1146+10.0000	109.023		1,800.000	900.000	900.000
High Point	1148+22.0327	102.831				
VPT	1155+10.0000	99.000	-1.114			
VPC	1176+50.0000	75.170	-1.114	K = 455.6		
VPI 4	1180+50.0000	70.715		800.000	400.000	400.000
Low Point	1181+57.3006	72.345				
VPT	1184+50.0000	73.285	0.643			
VPC	1209+44.2400	89.311	0.643	K = 904.1	SSD = 1475.5	
VPI 5	1214+44.2400	92.524		1,000.000	500.000	500.000
High Point	1215+25.1126	91.177				
Equation: Sta 1217+80.7067 (BK) = Sta 2169+83.9579 (AH)					End Region 2 ---------- Begin Region 3	
VPT	2171+47.4912	90.206	-0.464			
VPI 6	2173+88.1500	89.090	-0.464			

==========
Ending profile 429_A1 description

<*   2   Print Profile 429_A1_PGL_WB

Beginning profile 429_A1_PGL_WB description:
==========

	STATION	ELEV	GRADE	TOTAL L	BACK L	AHEAD L
VPI 1	1086+06.1700	96.203				
VPC	1102+38.1303	103.406	0.441	K = 860.8	SSD = 1364.1	
High Point	1106+18.0577	104.244				
VPI 2	1108+91.6300	106.290		1,306.999	653.500	653.500
Equation: Sta 1114+56.1750 (BK) = Sta 1114+87.2500 (AH)					End Region 1 ---------- Begin Region 2	
VPT	1115+76.2047	99.252	-1.077			
VPI 3	1122+46.1300	92.037	-1.077			

==========

Ending profile 429_A1_PGL_WB description

<* 3 Print Profile SR400EB

Beginning profile SR400EB description:

		STATION	ELEV	GRADE	TOTAL L	BACK L	AHEAD L
VPI	1	1033+68.5100	70.894				
VPC		1033+68.5101	70.894	-0.800	K = 231.9		
Low Point		1035+54.0172	70.152				
VPI	2	1037+68.5100	67.694		800.000	400.000	400.000
VPT		1041+68.5099	78.294	2.650			
VPC		1042+13.7500	79.492	2.650	K = 506.0 SSD = 1045.0		
VPI	3	1050+10.7500	100.613		1,594.000	797.000	797.000
High Point		1055+54.7341	97.260				
VPT		1058+07.7500	96.628	-0.500			
VPC		1059+52.0000	95.907	-0.500	K = 615.4		
Low Point		1062+59.6918	95.137				
VPI	4	1063+52.0000	93.907		800.000	400.000	400.000
VPT		1067+52.0000	97.107	0.800			
VPC		1071+17.9100	100.034	0.800	K = 566.0 SSD = 1105.2		
High Point		1075+70.7413	101.845				
VPI	5	1080+17.9100	107.234		1,800.000	900.000	900.000
VPT		1089+17.9100	85.814	-2.380			
VPC		1093+04.2700	76.619	-2.380	K = 384.6		
VPI	6	1097+04.2700	67.099		800.000	400.000	400.000
VPT		1101+04.2700	65.899	-0.300			
VPC		1101+58.3900	65.736	-0.300	K = 507.9 SSD = 1046.9		
VPI	7	1107+38.3900	63.996		1,160.000	580.000	580.000
VPT		1113+18.3900	49.008	-2.584			
VPC		1113+30.7500	48.689	-2.584	K = 208.1		
VPI	8	1117+55.7500	37.707		850.000	425.000	425.000
Low Point		1118+68.5650	41.740				
VPT		1121+80.7500	44.082	1.500			
VPI	9	1128+03.2700	53.419	1.500			

Ending profile SR400EB description

<* 4 Print Profile SR400WB

Beginning profile SR400WB description:

		STATION	ELEV	GRADE	TOTAL L	BACK L	AHEAD L
VPI	1	2037+10.2700	70.220				
VPC		2039+23.9102	70.861	0.300	K = 1666.7 SSD = 2298.3		
VPI	2	2044+23.9100	72.361		1,000.000	500.000	500.000
High Point		2044+23.9116	71.611				
VPT		2049+23.9098	70.861	-0.300			
VPC		2051+97.0600	70.041	-0.300	K = 296.3		
Low Point		2052+85.9484	69.908				

```
VPI      3 2055+97.0600     68.841              800.000   400.000   400.000
VPT        2059+97.0600     78.441      2.400

VPC        2063+00.5815     85.726      2.400  K =  506.0  SSD = 1045.0
High Point 2075+14.9832    100.299
VPI      4 2075+40.2811    115.479           2,479.399 1,239.700 1,239.700
VPT        2087+79.9807     84.486     -2.500

VPC        2091+26.6998     75.818     -2.500  K =  363.6
VPI      5 2095+26.7000     65.818              800.000   400.000   400.000
VPT        2099+26.7002     64.619     -0.300

VPC        2104+74.0546     62.976     -0.300  K =  506.0  SSD = 1045.0
VPI      6 2109+92.7050     61.421           1,037.301   518.650   518.650
VPT        2115+11.3554     49.232     -2.350

VPC        2115+33.0810     48.722     -2.350  K =  206.0
VPI      7 2119+69.7200     38.461              873.278   436.639   436.639
Low Point  2120+17.1810     43.033
VPT        2124+06.3590     46.710      1.889

VPI      8 2128+01.7000     54.179      1.889

================================================================================
Ending profile SR400WB description


<*       5   Print Profile CLI4


Beginning profile CLI4 description:
================================================================================

               STATION       ELEV      GRADE    TOTAL L    BACK L    AHEAD L

VPI      1  246+52.3100      84.32

VPC         246+60.0000      84.23      -1.13  K =  1490.5  SSD = 2735.4
VPI      2  249+95.0000      80.46              670.00    335.00    335.00
VPT         253+30.0000      75.19      -1.57

VPC         253+35.0000      75.11      -1.57  K =  422.8
VPI      3  257+35.0000      68.81              800.00    400.00    400.00
Low Point   260+00.8293      69.87
VPT         261+35.0000      70.08       0.32

VPC         271+00.0000      73.14       0.32  K =  831.7  SSD = 1397.4
High Point  273+63.9591      73.56
VPI      4  276+00.0000      74.73            1,000.00    500.00    500.00
VPT         281+00.0000      70.30      -0.88

VPC         281+40.0000      69.95      -0.88  K =  1282.2
VPI      5  285+15.0000      66.63              750.00    375.00    375.00
VPT         288+90.0000      65.51      -0.30

VPC         300+05.0000      62.16      -0.30  K =  355.6
Low Point   301+11.6665      62.00
VPI      6  304+05.0000      60.96              800.00    400.00    400.00
VPT         308+05.0000      68.76       1.95

VPC         308+40.0000      69.44       1.95  K =  501.2  SSD = 1040.0
VPI      7  317+60.0000      87.38            1,840.00    920.00    920.00
High Point  318+17.3183      78.97
VPT         326+80.0000      71.55      -1.72

VPC         326+80.0000      71.55      -1.72  K =  234.0
VPI      8  330+80.0000      64.66              800.00    400.00    400.00
Low Point   330+82.7689      68.08
VPT         334+80.0000      71.45       1.70
```

VPC		334+80.0000	71.45	1.70	K = 531.3	SSD = 1070.8	
VPI	9	341+60.0000	83.00		1,360.00	680.00	680.00
High Point		343+81.9555	79.11				
VPT		348+40.0000	77.13	-0.86			
VPC		351+55.0000	74.42	-0.86	K = 240.9		
VPI	10	352+95.0000	73.21		280.00	140.00	140.00
Low Point		353+62.7173	73.52				
VPT		354+35.0000	73.63	0.30			
VPC		359+00.0000	75.03	0.30	K = 573.9	SSD = 1900.2	
High Point		360+72.1792	75.28				
VPI	11	360+80.0000	75.57		360.00	180.00	180.00
VPT		362+60.0000	74.98	-0.33			
VPC		370+65.0000	72.34	-0.33	K = 1350.4	SSD = 1957.1	
VPI	12	375+65.0000	70.71		1,000.00	500.00	500.00
VPT		380+65.0000	65.37	-1.07			
VPC		391+45.0000	53.84	-1.07	K = 584.9		
VPI	13	395+45.0000	49.57		800.00	400.00	400.00
Low Point		397+69.5300	50.50				
VPT		399+45.0000	50.77	0.30			
VPC		404+40.0000	52.25	0.30	K = 516.7	SSD = 1953.3	
VPI	14	405+95.0000	52.72		310.00	155.00	155.00
High Point		405+95.0001	52.48				
VPT		407+50.0000	52.25	-0.30			
VPC		416+05.0000	49.69	-0.30	K = 390.1		
Low Point		417+22.0294	49.51				
VPI	15	420+05.0000	48.49		800.00	400.00	400.00
VPT		424+05.0000	55.49	1.75			
VPC		426+85.0000	60.39	1.75	K = 521.0	SSD = 1060.4	
VPI	16	435+00.0000	74.66		1,630.00	815.00	815.00
High Point		435+97.2237	68.38				
VPT		443+15.0000	63.43	-1.38			
VPC		443+15.0000	63.43	-1.38	K = 432.4		
VPI	17	447+15.0000	57.92		800.00	400.00	400.00
Low Point		449+10.6846	59.33				
VPT		451+15.0000	59.81	0.47			
VPC		457+40.0000	62.76	0.47	K = 517.8	SSD = 1596.8	
VPI	18	459+40.0000	63.71		400.00	200.00	200.00
High Point		459+84.6598	63.34				
VPT		461+40.0000	63.11	-0.30			
VPC		464+30.0000	62.24	-0.30	K = 619.4		
Low Point		466+15.8301	61.96				
VPI	19	468+30.0000	61.04		800.00	400.00	400.00
VPT		472+30.0000	65.01	0.99			
VPC		480+45.0000	73.09	0.99	K = 643.1	SSD = 3409.4	
VPI	20	481+50.0000	74.13		210.00	105.00	105.00
VPT		482+55.0000	74.83	0.66			
VPC		492+35.0000	81.34	0.66	K = 985.3	SSD = 1563.1	
VPI	21	497+35.0000	84.67		1,000.00	500.00	500.00
High Point		498+90.1600	83.52				
VPT		502+35.0000	82.92	-0.35			
VPC		505+10.0000	81.95	-0.35	K = 323.1		
VPI	22	506+15.0000	81.59		210.00	105.00	105.00
Low Point		506+23.0769	81.76				
VPT		507+20.0000	81.90	0.30			
VPC		513+04.0000	83.65	0.30	K = 509.1	SSD = 1260.9	
High Point		514+56.7277	83.88				
VPI	23	515+84.0000	84.49		560.00	280.00	280.00

VPT		518+64.0000	82.25	-0.80				
VPC		533+15.0000	70.65	-0.80	K = 420.4			
VPI	24	534+20.0000	69.81		210.00	105.00	105.00	
VPT		535+25.0000	69.49	-0.30				
VPC		545+61.1000	66.38	-0.30	K = 349.7			
VPI	25	546+66.1000	66.06		210.00	105.00	105.00	
Low Point		546+66.1793	66.22					
VPT		547+71.1000	66.38	0.30				
VPC		551+97.7900	67.66	0.30	K = 412.4			
VPI	26	555+97.7900	68.86		800.00	400.00	400.00	
VPT		559+97.7900	77.82	2.24				
VPC		563+80.0000	86.38	2.24	K = 506.5	SSD = 1045.5		
VPI	27	571+50.0000	103.63		1,540.00	770.00	770.00	
High Point		575+14.5947	99.09					
VPT		579+20.0000	97.46	-0.80				
VPC		583+80.0000	93.78	-0.80	K = 206.7			
Low Point		585+45.4349	93.12					
VPI	28	585+55.0000	92.38		350.00	175.00	175.00	
VPT		587+30.0000	93.94	0.89				
VPC		589+55.0000	95.95	0.89	K = 541.5	SSD = 1081.0		
High Point		594+38.4960	98.11					
VPI	29	599+75.0000	105.06		2,040.00	1,020.00	1,020.00	
VPT		609+95.0000	75.74	-2.87				
VPI	30	615+00.0000	61.22	-2.87				

==========
Ending profile CLI4 description

<* 6 Print Profile EE2

Beginning profile EE2 description:
==========

		STATION	ELEV	GRADE	TOTAL L	BACK L	AHEAD L
VPI	1	14+00.2500	75.344				
VPC		17+66.5600	73.805	-0.420	K = 174.2		
Low Point		18+39.7308	73.652				
VPI	2	20+16.5601	72.755		500.000	250.000	250.000
VPT		22+66.5602	78.880	2.450			
VPC		30+02.5562	96.912	2.450	K = 136.8	SSD = 567.6	
VPI	3	32+04.3719	101.857		403.631	201.816	201.816
High Point		33+37.7755	101.019				
VPT		34+06.1876	100.848	-0.500			
VPI	4	35+39.7500	100.180	-0.500			

==========
Ending profile EE2 description

<* 7 Print Profile EE3

Beginning profile EE3 description:
==========

		STATION	ELEV	GRADE	TOTAL L	BACK L	AHEAD L
VPI	1	14+28.6900	87.997				
VPC		14+31.2801	87.934	-2.440	K = 96.1		
Low Point		16+65.8003	85.072				
VPI	2	16+66.2800	82.200		470.000	235.000	235.000
VPT		19+01.2799	87.957	2.450			
VPI	3	19+27.0280	88.588	2.450			

==========

Ending profile EE3 description

<* 8 Print Profile EE4

Beginning profile EE4 description:

==========

		STATION	ELEV	GRADE	TOTAL L	BACK L	AHEAD L
VPI	1	14+17.1100	65.720				
VPI	2	15+72.0500	65.255	-0.300			
VPC		18+48.9700	63.413	-0.665	K = 199.6		
VPI	3	19+48.9700	62.748		200.000	100.000	100.000
Low Point		19+81.6951	62.972				
VPT		20+48.9700	63.085	0.337			
VPI	4	21+30.5000	63.360	0.337			

==========

Ending profile EE4 description

<* 9 Print Profile EE5

Beginning profile EE5 description:

==========

		STATION	ELEV	GRADE	TOTAL L	BACK L	AHEAD L
VPI	1	13+19.4300	87.270				
VPC		15+25.1883	88.402	0.550	K = 148.9 SSD = 566.9		
High Point		16+07.1015	88.627				
VPI	2	18+75.1879	90.327		699.999	350.000	350.000
VPT		22+25.1875	75.802	-4.150			
VPC		25+74.7100	61.296	-4.150	K = 102.7		
VPI	3	27+24.7100	55.071		300.000	150.000	150.000
VPT		28+74.7100	53.226	-1.230			
VPI	4	31+50.0300	49.840	-1.230			

==========

Ending profile EE5 description

<* 10 Print Profile GG

Beginning profile GG description:

==========

		STATION	ELEV	GRADE	TOTAL L	BACK L	AHEAD L
VPI	1	15+38.1600	86.280				
VPI	2	16+00.0000	87.022	1.200			
VPI	3	16+00.0000	87.320				
VPC		16+18.0400	87.536	1.200	K = 153.8		
VPI	4	17+18.0400	88.736		200.000	100.000	100.000
VPT		18+18.0400	91.236	2.500			
VPC		19+12.5011	93.598	2.500	K = 195.0 SSD = 648.7		
High Point		23+99.9989	99.692				
VPI	5	24+00.0000	105.785		974.998	487.499	487.499
VPT		28+87.4989	93.598	-2.500			
VPC		34+54.7058	79.418	-2.500	K = 133.3		
VPI	6	35+54.7058	76.918		200.000	100.000	100.000
VPT		36+54.7058	75.918	-1.000			
VPI	7	39+32.0000	73.145	-1.000			

==========

Ending profile GG description

<* 11 Print Profile HH1

Beginning profile HH1 description:

==========

		STATION	ELEV	GRADE	TOTAL L	BACK L	AHEAD L
VPI	1	15+36.0000	88.390				
VPC		15+40.0000	88.464	1.860	K = 180.7		
VPI	2	16+40.0000	90.324		200.000	100.000	100.000
VPT		17+40.0000	93.292	2.967			
VPI	3	17+75.0000	94.330	2.967			
VPI	4	17+75.0000	94.708				
VPC		18+36.8217	96.409	2.750	K = 136.0 SSD = 541.7		
VPI	5	22+00.6200	106.413		727.597	363.798	363.798
High Point		22+10.8217	101.551				
VPT		25+64.4183	96.954	-2.600			
VPC		27+25.0001	92.779	-2.600	K = 108.7		
VPI	6	29+75.0000	86.279		500.000	250.000	250.000
Low Point		30+07.6075	89.105				
VPT		32+24.9999	91.279	2.000			
VPI	7	34+00.0000	94.779	2.000			
VPI	8	34+00.0000	95.080				
VPC		34+02.5000	95.130	2.000	K = 161.1 SSD = 589.6		
High Point		37+24.7222	98.352				
VPI	9	37+65.0000	102.380		725.000	362.500	362.500
VPT		41+27.5000	93.318	-2.500			
VPC		45+67.4915	82.318	-2.500	K = 357.1		
VPI	10	50+67.4911	69.818		999.999	500.000	500.000
Low Point		54+60.3485	71.157				
VPT		55+67.4907	71.318	0.300			

```
VPI     11   56+34.9200     71.520      0.300

================================================================================
Ending profile HH1 description


<*      12   Print Profile HH2

Beginning profile HH2 description:
================================================================================

              STATION       ELEV      GRADE    TOTAL L    BACK L    AHEAD L

VPI      1   11+46.8100     91.820

VPC          12+08.6400     90.985     -1.350  K =  181.8  SSD = 803.9
VPI      2   13+58.6400     88.960              300.000   150.000   150.000
VPT          15+08.6400     84.460     -3.000

VPC          15+94.1700     81.894     -3.000  K =  160.0
VPI      3   16+94.1700     78.894              200.000   100.000   100.000
VPT          17+94.1700     77.144     -1.750

VPI      4   19+50.0000     74.417     -1.750

================================================================================
Ending profile HH2 description


<*      13   Print Profile LL1

Beginning profile LL1 description:
================================================================================

              STATION       ELEV      GRADE    TOTAL L    BACK L    AHEAD L

VPI      1   16+39.3600    105.520

VPC          17+22.1700    106.058      0.650  K =  181.8  SSD = 803.9
High Point   18+40.3518    106.442
VPI      2   18+72.1700    107.033              300.000   150.000   150.000
VPT          20+22.1700    105.533     -1.000

VPC          21+16.9793    104.585     -1.000  K =  96.0
Low Point    22+12.9792    104.105
VPI      3   22+72.9800    103.025              312.001   156.001   156.001
VPT          24+28.9807    106.535      2.250

VPC          30+68.3764    120.922      2.250  K =  136.0  SSD = 541.7
High Point   33+74.3786    124.364
VPI      4   34+93.3764    130.484              850.000   425.000   425.000
VPT          39+18.3764    113.484     -4.000

VPC          49+10.1707     73.813     -4.000  K =  96.0
VPI      5   51+21.3700     65.365              422.399   211.199   211.199
Low Point    52+94.1691     66.133
VPT          53+32.5693     66.210      0.400

VPI      6   57+57.7900     67.910      0.400

================================================================================
Ending profile LL1 description


<*      14   Print Profile LL2
```

Beginning profile LL2 description:

	STATION	ELEV	GRADE	TOTAL L	BACK L	AHEAD L
VPI 1	15+93.4200	111.340				
VPC	19+21.1202	119.205	2.400	K = 136.0 SSD = 541.7		
High Point	22+47.5202	123.122				
VPI 2	24+18.8800	131.151		995.520	497.760	497.760
VPT	29+16.6398	106.661	-4.920			
VPC	34+83.2902	78.782	-4.920	K = 96.0		
VPI 3	37+43.4500	65.982		520.320	260.160	260.160
Low Point	39+55.6099	67.163				
VPT	40+03.6098	67.283	0.500			
VPC	47+16.4500	70.847	0.500	K = 157.9 SSD = 717.9		
High Point	47+95.3956	71.045				
VPI 4	48+66.4500	71.597		300.000	150.000	150.000
VPT	50+16.4500	69.497	-1.400			
VPI 5	50+96.9600	68.370	-1.400			

Ending profile LL2 description

<* 15 Print Profile LL3

Beginning profile LL3 description:

	STATION	ELEV	GRADE	TOTAL L	BACK L	AHEAD L
VPI 1	10+00.0000	72.949				
VPC	10+25.0000	73.496	2.191	K = 161.8 SSD = 599.1		
VPI 2	12+75.0000	78.973		500.000	250.000	250.000
High Point	13+79.4018	77.378				
VPT	15+25.0000	76.723	-0.900			
VPC	15+50.0000	76.498	-0.900	K = 153.8		
VPI 3	16+50.0000	75.598		200.000	100.000	100.000
Low Point	16+88.4615	75.875				
VPT	17+50.0000	75.998	0.400			
VPC	18+69.8098	76.477	0.400	K = 333.3 SSD = 1348.9		
High Point	20+03.1431	76.744				
VPI 4	20+19.8100	77.077		300.000	150.000	150.000
VPT	21+69.8102	76.327	-0.500			
VPC	32+78.1100	70.786	-0.500	K = 160.0		
Low Point	33+58.1102	70.586				
VPI 5	33+78.1100	70.286		200.000	100.000	100.000
VPT	34+78.1100	71.036	0.750			
VPI 6	43+21.6400	77.362	0.750			
VPI 7	45+06.0000	78.290	0.503			

Ending profile LL3 description

<* 16 Print Profile MM1

Beginning profile MM1 description:

		STATION	ELEV	GRADE	TOTAL L	BACK L	AHEAD L
VPI	1	13+87.0900	71.970				
VPC		14+67.4131	73.336	1.700	K = 136.0 SSD = 543.4		
High Point		16+98.6145	75.301				
VPI	2	17+17.9500	77.595		501.074	250.537	250.537
VPT		19+68.4869	72.623	-1.984			
VPC		22+07.1320	67.888	-1.984	K = 96.0		
VPI	3	23+37.3600	65.303		260.456	130.228	130.228
Low Point		23+97.6302	65.997				
VPT		24+67.5880	66.252	0.729			
VPC		31+83.9582	71.473	0.729	K = 190.0		
VPI	4	32+95.2300	72.284		222.544	111.272	111.272
VPT		34+06.5018	74.398	1.900			
VPC		46+84.0696	98.672	1.900	K = 142.9 SSD = 558.3		
VPI	5	49+34.0700	103.422		500.001	250.000	250.000
High Point		49+55.4993	101.250				
VPT		51+84.0704	99.422	-1.600			
VPC		53+59.9200	96.608	-1.600	K = 200.0		
Low Point		56+79.9185	94.048				
VPI	6	57+09.9200	91.008		700.000	350.000	350.000
VPT		60+59.9200	97.658	1.900			
VPC		62+76.2100	101.768	1.900	K = 70.0 SSD = 388.7		
High Point		64+09.2109	103.031				
VPI	7	64+94.9600	105.924		437.500	218.750	218.750
VPT		67+13.7100	96.408	-4.350			
VPC		71+30.9955	78.257	-4.350	K = 79.0		
VPI	8	72+79.1200	71.813		296.249	148.125	148.125
VPT		74+27.2445	70.924	-0.600			
VPI	9	74+54.6400	70.760	-0.600			

Ending profile MM1 description

<* 17 Print Profile MM2

Beginning profile MM2 description:

		STATION	ELEV	GRADE	TOTAL L	BACK L	AHEAD L
VPI	1	13+44.7000	92.790				
VPC		13+56.6007	92.974	1.550	K = 136.0 SSD = 541.7		
High Point		15+67.4007	94.608				
VPI	2	17+00.0000	98.297		686.799	343.399	343.399
VPT		20+43.3993	86.278	-3.500			
VPC		21+05.9104	84.090	-3.500	K = 96.0		
VPI	3	23+00.3100	77.286		388.799	194.400	194.400
Low Point		24+41.9094	78.210				
VPT		24+94.7096	78.356	0.550			
VPI	4	30+48.2400	81.400	0.550			

Ending profile MM2 description

<*   18   Print Profile MM3

Beginning profile MM3 description:

		STATION	ELEV	GRADE	TOTAL L	BACK L	AHEAD L
VPI	1	13+88.8000	87.927				
VPC		13+88.8471	87.926	-2.200	K = 96.0		
Low Point		16+00.0488	85.603				
VPI	2	17+00.8500	81.062		624.006	312.003	312.003
VPT		20+12.8529	94.478	4.300			
VPC		20+60.2369	96.516	4.300	K = 136.0 SSD = 541.7		
High Point		26+45.0427	109.089				
VPI	3	26+92.6400	123.710		1,264.806	632.403	632.403
VPT		33+25.0431	92.089	-5.000			
VPC		41+72.8298	49.700	-5.000	K = 96.0		
VPI	4	43+89.5500	38.864		433.440	216.720	216.720
VPT		46+06.2702	37.813	-0.485			
VPI	5	55+67.6900	33.150	-0.485			

Ending profile MM3 description

<*   19   Print Profile NN1

Beginning profile NN1 description:

		STATION	ELEV	GRADE	TOTAL L	BACK L	AHEAD L
VPI	1	18+72.8000	39.450				
VPC		18+82.6851	39.480	0.300	K = 96.8		
VPI	2	21+10.1853	40.162		455.000	227.500	227.500
VPT		23+37.6855	51.537	5.000			
VPC		26+64.6000	67.883	5.000	K = 137.2 SSD = 544.1		
VPI	3	32+78.6000	98.583		1,228.000	614.000	614.000
High Point		33+50.6313	85.034				
VPT		38+92.6000	74.330	-3.950			
VPC		39+01.2186	73.989	-3.950	K = 96.0		
VPI	4	40+90.8200	66.500		379.203	189.601	189.601
VPT		42+80.4214	66.500	0.000			
VPC		51+26.5156	66.500	0.000	K = 96.0		
VPI	5	53+53.1100	66.500		453.189	226.594	226.594
VPT		55+79.7044	77.197	4.721			
VPC		56+28.5922	79.505	4.721	K = 136.0 SSD = 541.7		
VPI	6	61+24.7600	102.927		992.336	496.168	496.168
High Point		62+70.6096	94.659				
VPT		66+20.9278	90.147	-2.576			
VPC		67+17.3987	87.662	-2.576	K = 96.0		
VPI	7	68+74.6400	83.611		314.483	157.241	157.241
Low Point		69+64.6822	84.477				
VPT		70+31.8813	84.712	0.700			

VPI 8 70+46.0000 84.811 0.700

==========
Ending profile NN1 description

<* 20 Print Profile NN2

Beginning profile NN2 description:
==========

		STATION	ELEV	GRADE	TOTAL L	BACK L	AHEAD L
VPI	1	21+80.9200	92.389				
VPI	2	21+98.1300	91.895	-2.870			
VPI	3	22+13.2700	91.323	-3.777			
VPI	4	22+33.2700	90.560	-3.813			
VPI	5	22+53.2700	89.812	-3.740			
VPI	6	22+73.2700	89.050	-3.814			
VPI	7	22+93.2700	88.288	-3.805			
VPI	8	23+13.2700	87.527	-3.809			
VPI	9	23+33.2700	86.777	-3.750			
VPI	10	23+53.2700	86.048	-3.644			
VPI	11	23+73.2700	85.307	-3.707			
VPI	12	23+93.2700	84.537	-3.848			
VPC		24+78.9377	80.767	-4.400	K = 96.0		
Low Point		29+01.3394	71.475				
VPI	13	29+30.1382	60.915		902.401	451.200	451.200
VPT		33+81.3386	83.475	5.000			
VPC		35+40.2914	91.422	5.000	K = 136.0 SSD = 541.7		
VPI	14	41+09.5052	119.883		1,138.427	569.214	569.214
High Point		42+20.2904	108.422				
VPT		46+78.7189	100.696	-3.371			
VPC		46+79.2017	100.680	-3.371	K = 96.0		
VPI	15	48+41.0000	95.226		323.597	161.798	161.798
VPT		50+02.7983	95.226	0.000			
VPI	16	50+02.8000	95.226	0.000			

==========
Ending profile NN2 description

<* 21 Print Profile OO1

Beginning profile OO1 description:
==========

		STATION	ELEV	GRADE	TOTAL L	BACK L	AHEAD L
VPI	1	134+10.0600	68.368				

```
VPC          141+75.0000     70.663      0.300  K =  127.8
VPI      2   144+00.0000     71.338               450.000   225.000   225.000
VPT          146+25.0000     79.932      3.820

VPC          146+42.6392     80.606      3.820  K =  185.0  SSD = 631.8
VPI      3   151+69.8900    100.747            1,054.502   527.251   527.251
High Point   153+49.3377     94.104
VPT          156+97.1408     90.835     -1.880

VPC          158+38.7400     88.173     -1.880  K =  128.9
Low Point    160+81.0098     85.895
VPI      4   160+88.7400     83.473               500.000   250.000   250.000
VPT          163+38.7400     88.473      2.000

VPC          166+51.6866     94.732      2.000  K =  313.6  SSD = 822.7
High Point   172+78.9117    101.004
VPI      5   174+20.0400    110.099            1,536.707   768.353   768.353
VPT          181+88.3934     87.816     -2.900

VPC          185+26.2800     78.018     -2.900  K =  246.0
VPI      6   188+33.7800     69.100               615.000   307.500   307.500
VPT          191+41.2800     67.870     -0.400

VPC          202+54.0000     63.419     -0.400  K =  443.4  SSD = 978.2
VPI      7   207+75.0000     61.335            1,042.000   521.000   521.000
VPT          212+96.0000     47.008     -2.750
```

==========

Ending profile OO1 description

<*   22   Print Profile OO2

Beginning profile OO2 description:

==========

```
                STATION       ELEV      GRADE    TOTAL L    BACK L    AHEAD L

VPI      1   13+02.8700     46.070

VPC          15+59.9799     40.096     -2.324  K =  96.0
VPI      2   17+38.4000     35.950               356.840   178.420   178.420
Low Point    17+83.0442     37.504
VPT          19+16.8201     38.436      1.393

VPI      3   19+16.8300     38.437      1.393
```

==========

Ending profile OO2 description

<*   23   Print Profile OO3

Beginning profile OO3 description:

==========

```
                STATION       ELEV      GRADE    TOTAL L    BACK L    AHEAD L

VPI      1   19+11.2600     99.526

VPC          19+30.3900     99.396     -0.680  K =  156.2
VPI      2   20+30.3900     98.716               200.000   100.000   100.000
Low Point    20+36.6413     99.034
VPT          21+30.3900     99.316      0.600

VPC          21+45.2410     99.405      0.600  K =  139.2  SSD = 548.2
High Point   22+28.7849     99.655
```

```
VPI      3   24+20.2400    101.055              549.998   274.999   274.999
VPT          26+95.2390     91.842     -3.350

VPC          30+80.7500     78.928     -3.350  K =  99.6
VPI      4   32+30.7500     73.903              300.000   150.000   150.000
VPT          33+80.7500     73.397     -0.337

VPI      5   57+80.1100     65.300     -0.337

================================================================================
Ending profile OO3 description


<*      24   Print Profile OO4


Beginning profile OO4 description:
================================================================================

               STATION       ELEV      GRADE    TOTAL L    BACK L    AHEAD L

VPI      1   11+63.0600     83.620

VPC          12+38.6800     81.602     -2.669  K =  103.7
VPI      2   13+56.1800     78.466              235.000   117.500   117.500
VPT          14+73.6800     77.992     -0.403

VPI      3   29+47.6900     72.050     -0.403

================================================================================
Ending profile OO4 description


<*      25   Print Profile RR


Beginning profile RR description:
================================================================================

               STATION       ELEV      GRADE    TOTAL L    BACK L    AHEAD L

VPI      1   13+11.8000     71.102

VPI      2   18+10.7789     60.537     -2.117

================================================================================
Ending profile RR description


<*      26   Print Profile CR46AEB


Beginning profile CR46AEB description:
================================================================================

               STATION       ELEV      GRADE    TOTAL L    BACK L    AHEAD L

VPI      1    4+68.2000     85.636

VPC           4+71.7395     85.518     -3.347  K =  96.0
VPI      2    7+71.5800     75.483              599.681   299.840   299.840
Low Point     7+93.0205     80.142
VPT          10+71.4205     84.178      2.900

VPC          12+10.6812     88.217      2.900  K =  136.0  SSD = 573.8
VPI      3   14+03.0200     93.795              384.678   192.339   192.339
VPT          15+95.3589     93.932      0.071
```

VPI   4   15+96.0000   93.933   0.071

==========
Ending profile CR46AEB description

<*   Output Section8-Profs

Output file SECTION8-PROFS is stored

Section 5 – Superelevation Transition Calculations

Subject: SUPERELEVATION CALCULATIONS		
Comp by: / Check by:	Date: / Job Number:	Sheet Number: 1

ATKINS

429A1-1

R = 5951

DS = 70 mph

e = 0.036

429A1-1 LEFT

R = 200

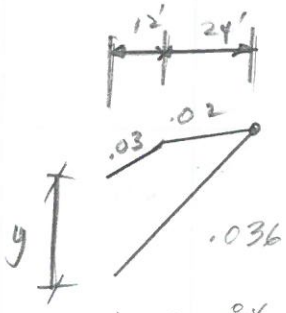
L = 200(0.456) = 91.2 ⇒ 100' min

80%L = 80'

BEGIN TRANS = (PC) 1134+95.08 − 80

= 1134 + 15.08 ⇒ 1134+15

END TRANS = 1134+15 + 100 = 1135+15



1.296 .84

$y = -0.036(36) - \left(-.02(24) + .03(12)\right)$

= 0.456'

429A1-1 RIGHT

R = 200

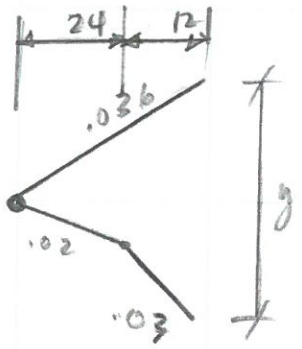
L = 200(2.136) = 427.2 ⇒ 428

80%L = 342.4

BEGIN TRANS: 1134+95.08 − 342.4

= 1131+52.68 ⇒ 1131+53

END TRANS: 1131+53 + 428 = 1135+81



$y = 0.036(36) - \left[-0.02(24) + .03(12)\right]$

= 2.136

$e_{1132+45.08}$ = .036

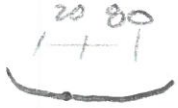
Subject:		Sheet Number: 2
Comp by: / Check by:	Date: / Job Number:	

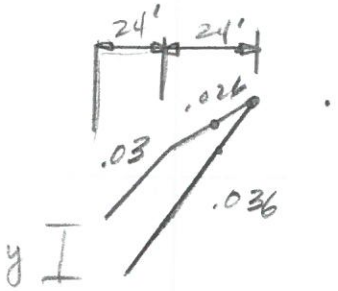
ATKINS

429 A1 - 1, 2

R = 8425
DS = 70
e = 0.026

429 A1 - 1, 2 LEFT





R = 200

$y = -.036(48) - [-0.026(24) + -.03(24)]$

$y = 0.384$

$L = 200(.384)$ 76.8 $\Rightarrow$ 100' min

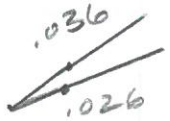
20% L = 20

BEGIN TRANS = PCC STA 1189 + 40.80 - 20

= 1189 + 20.80 $\Rightarrow$ 1189+20

END TRANS = 1189 + 20 + 100 = 1190+20

429 A1 - 1, 2 RIGHT



$\Delta = 0.01$

R = 200

$\Delta = 0.01$

W = 36

$L = 200(0.01)(36) = 72 \Rightarrow$ 100' min.

20% L = 20'

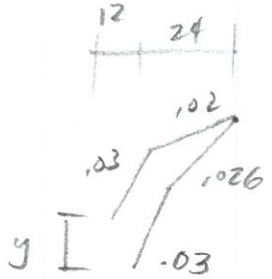
TRANSITIONS SAME AS ABOVE

Subject:		Sheet Number: 3
Comp by: / Check by:	Date: / Job Number:	

ATKINS

429 A1 - 2,3

R = 10,955
DS = 70
e = RC

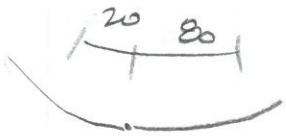


429 A1 - 2,3 LEFT

R = 200

$y = [-(.026)(24) + .03(12)] - [-.02(24) + .03(12)]$

y = 0.144



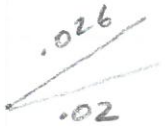
L = 200(0.144) = 28.8 ⇒ 100' MIN

20'/.2 = 20

BEGIN TRANS. = 1189 + 16.27 − 20

1188+96.27 ⇒ 1189+00 (ARBITRARILY ROUND UP TO EVEN STATION)

END TRANS = 1189+00 + 100 = 1190+00



Δ = .006

429 A1 - 2,3 RIGHT

R = 200
Δ = 0.06
W = 36
L = 200(.006)36 = 43.2 ⇒ 100' MIN

SAME TRANSITIONS AS ABOVE

Subject:

Comp by: Date: Sheet Number: 4

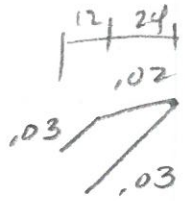
Check by: Job Number:

ATKINS

429-A1-3 MID CURVE TRANSITIONS

LEFT PER HYDROPLANE ANALYSIS PROVIDE 3% ACROSS TOWN CENTER BRIDGE

R=200
DS= 70
y= 0.24
L= 200(.24) = 48'
L= 48



y= 36(.03) - 24(.02) - 12(.03)
y= 0.24

USE 48' TO TRANSITION 2 LANES TO MATCH BRIDGE CROSS SLOPE.
100' MIN. NOT NECESSARY SINCE NOT A FULL WIDTH RIDW TRANSITION

BEGIN TRANS: 1200+00 END TRANS: 1200+48 (ARBITRARY)

RIGHT: PER HYDROPLANE ANALYSIS PROVIDE 5.1% ACROSS TOWN CENTER BRIDE

R= 200
DS = 70
Δ = 0.025
W = 36
L= 200(36)(.025)
L= 180'

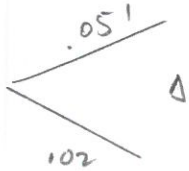
Δ= 0.025

BEGIN TRANSITION IN ADVANCE OF GORE TO AVOID TRANSITON OF MAINLINE AND RAMP IN SAME LOCATION

BEGIN TRANS: 1192+20 (ARBITRARY)

END TRANS: 1194+00

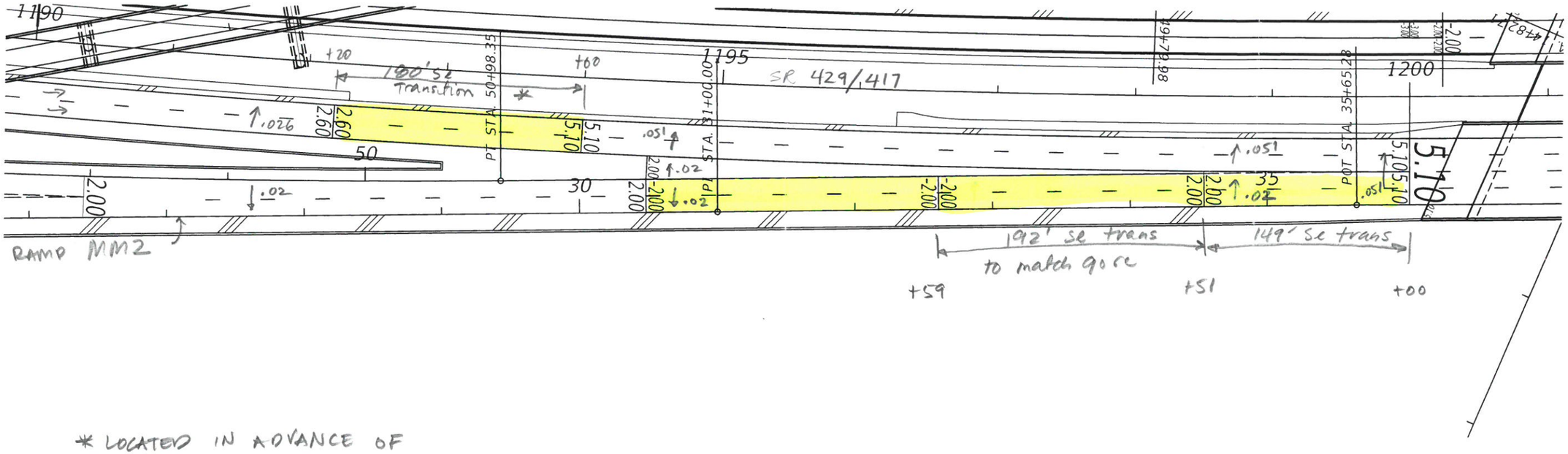
ALONG RAMP MM2
L= 200(24)(.071) = 340.8 ≈ 341



Δ= 0.071

BEGIN TRANS: 1196+59 (ARBITRARY)

END TRANS: 1196+59 + 341 = 1200+00



* LOCATED IN ADVANCE OF GORE TO AVOID TRANSITIONING MAINLINE AND RAMP IN SAME LOCATION

Subject:

Comp by: Date: Sheet Number: 6

Check by: Job Number:

ATKINS

429A1-3 MID CURVE TRANSITION

RIGHT: PER HYDROPLANE ANALYSIS PROVIDE 4.1% CROSS SLOPE THRU 4-LANE (FUTURE 5-LANE) SECTION SOUTH OF TOWN CENTER BRIDGE

R = 200
DS = 70
Δ = 0.1 L = 200 (.01) 60 = 120'
W = 60

.05'
.041

Δ = 0.01

BEGIN TRANS: 1202+50 (ARBITRARY)

END TRANS: 1202 + 50 + 120 = 1203+70

Subject:		
Comp by: / Check by:	Date: / Job Number:	Sheet Number: 7

ATKINS

429 A1 - 3 SB

* .041 REQUIRED PER HYDROPLANE ANALYSIS

R = 10955

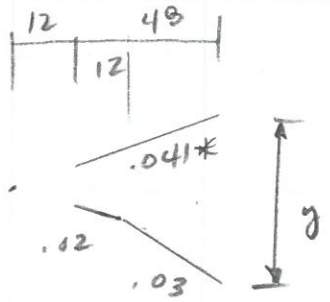
DS = 70

e_{req} = RC

e_{prov} = 0.041 *

R = 200

y = 4.02



L = 200 (4.02) = 804'

y = 60(.041) + 24(.02) + 36(.03)

y = 4.02

SE TRANSITION LOCATED TO MATCH EXISTING IN ADVANCE OF EXISTING BRIDGE.

BEGIN BRIDGE: 1213+00 (ARBITRARY)

END TRANSITION 1213+00 + 804 + (2169+83.96 - 1217+80.71)

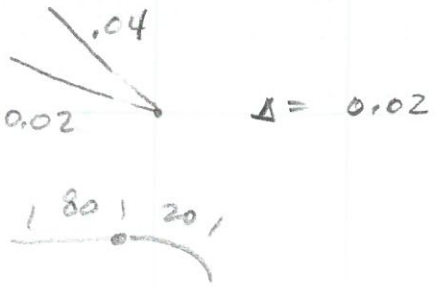
= 2173+07.25

APPROACH SLAB BEGINS AT 2173+32.32 (SKEW)

STA EQ = 1217+80.71 BK = 2169+83.96 AH

CR 46A-1

R = 5355 R = 200
DS = 50 Δ = 0.02
e = 0.04 * W = 15



L = 200 (0.02) 15
= 60 ⇒ 100' Min.
80%L = 80'

BEGIN TRANS

13 + 17.20 − 80 = 12+37.2 ⇒ 12+36

END TRANS: 12+38 +100' = 13+38

* 0.023 required
Provide 0.04 to match aux lane along EB SR 402

GG-1

R = 7639
DS = 50
e_{req} = RC - Provide 0.03 to match ramp terminal

GG-2

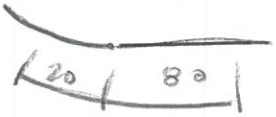
R = 4599
DS = 50
e_{req} = 0.026 - Provide 0.03 to match GG1 and eliminate addtl transitions

R = 4599 R = 200
D = 50 Δ = 0.01
e = 0.03 prov. W = 15

L = 200(0.01)15 = 30' ⇒ 100' MIN.

.02 / .03 Δ = .01

20 % L = 20



BEGIN TRANS = PT 31+55.05 - 20
= 31+35.05 ⇒ 31+35

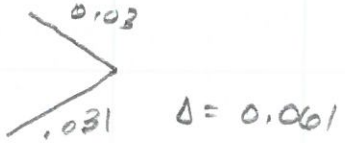
END TRANS = 31+35 + 100 = 32+35

HH1-1

R = 3820 R = 200

DS = 50 Δ = 0.061

e = 0.031 W = 15



L = 200(0.061) 15 = 183

80%L = 146.4

BEGIN TRANS = 18+05.15 − 146.4

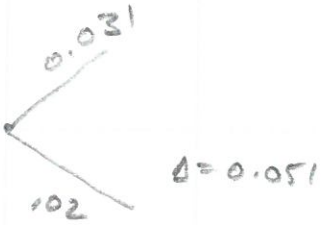
= 16+58.75 ⇒ 16+59

END TRANS = 16+59 + 183 = 18+42

R = 200

Δ = 0.051

W = 15



L = 200(0.051) 15 = 153

20%L = 30.6

BEGIN TRANS = 30+47.43 − 30.6

= 30 + 16.83 ⇒ 30+16

END TRANS = 30+16 + 153 = 31+69

Subject:

Comp by: Date: Sheet Number: 11

Check by: Job Number:

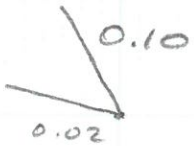
ATKINS

HH1-2

R = 330 R = 175

DS = 35 Δ = 0.08

e = 0.10 W = 15



Δ = 0.08

L = 175(0.08) 15 = 210

80%L = 168'

BEGIN TRANS = 41+26.08 − 168 =

= 39+58.08 ⇒ 39+60 (Arbitrary round up +60 vs. +59)

END TRANS = 39+60 + 210 = 41+70

Subject:		Sheet Number: 12
Comp by: / Check by:	Date: / Job Number:	

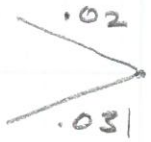
ATKINS

HH2-1

R = 3835 R = 200

DS = 50 Δ = 0.051

e = 0.031 w = 15



Δ = 0.051

L = 200(0.051) 15 = 153

20% L = 30.6

BEGIN TRANS = (PT) 15 + 56.9 - 30.6

= 15 + 26.3 ⇒ 15 + 26

END TRANS = 15 + 26 + 153 = 16+79

NOTE: CURVE IS IN FULL SUPER AS RAMP EXIT FROM RAMP HH1

Subject:		
Comp by: / Check by:	Date: / Job Number:	Sheet Number: 13

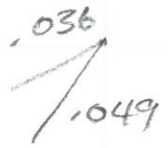
ATKINS

LL 1-1

R = 2307 R = 200

DS = 50 Δ = 0.013

e = 0.049 w = 15



Δ = 0.013

L = 200(0.013) 15

= 39 ⇒ 100' MIN

80% L = 80

BEGIN TRANS = (PC) 16 + 30.58 − 80

= 15 + 50.58 ⇒ 15+51

END TRANS = 15+51 +100 = 16+51

R = 200

Δ = 0.069

w = 15

Δ = .069

L = 200(0.069) 15 = 207

20% L = 41.4

BEGIN TRANS = (PT) 19 + 59.76 − 41.4

= 19 + 18.36 ⇒ 19+18

END TRANS = 19+18 + 207 = 21+25

Subject:

Comp by: Date: Sheet Number: 14

Check by: Job Number:

ATKINS

LL1-2

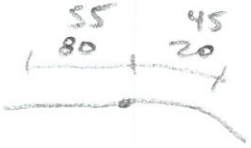
R= 1000 R=200

DS= 50 Δ = 0.07

e=0.09 w= 15

Δ = 0.07

L= 200(0.07) 15 = 210



80%.L = 168' ⇒ Use 55%.L on tangent to keep transition off bridge

55%.L = 115.5

BEGIN TRANS = (PC) 27+04.23 - 115.5

= 25+88.73 ⇒ 25+88

END TRANS = 25+88 + 210 = 27+98

LL1-2,3

R= 1175 R=200

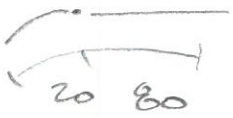
DS = 50 Δ = 0.07

e= 0.082 w= 15

Δ = 0.07

L= 200(0.07) 15 = 210

20%.L = 42'



BEGIN TRANS = (PT) 34+81.43 -42

= 34+39.43 ⇒ 34+39

END TRANS = 34+39 + 210 = 36+49

ATKINS

LL1 -3

R= 1175 R= 200
DS= 50 Δ = 0.102
e = 0.082 W= 15

Δ= 0.102

L= 200(.102)15 = 306'

50%L = 153

BEGIN TRANS: (PC) 39+04.63 - 153

37+51.63 ⇒ 37+49 **

END TRANS: 37+49 + 306 = 40+55

* use 50/50 transition split to provide 0.0% cross slope as far from high point of curve as possible. Also, provide 100' @ 0.02 between SC transitions. Also, keeps transition off bridge

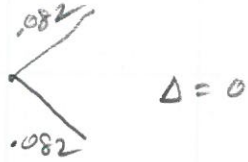
LL1 - 3,4

R= 1165 R= 200
DS= 50 Δ = 0.164
e = 0.082 W = 24

L= 200(0.164)(24) = 787.2 ⇒ 788'

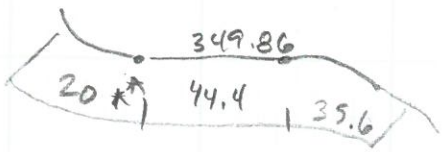
20%L = 157.6

BEGIN TRANS = (PT) 43+06.59 - 157.6
= 41+48.99 ⇒ 41+49



Δ= 0.164

END TRANS = 41+49 + 788 = 49+37



** use 20% unbalanced split to maximize distance @ 0.02 at ramp terminal

Subject:

Comp by: Date: Sheet Number: 16

Check by: Job Number:

ATKINS

LL1 - 4,5

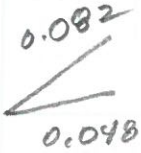
$R_4 = 1165$ $R = 200$

$e_4 = 0.082$ $\Delta = 0.034$

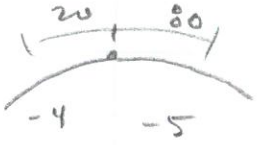
$R_5 = 2330$ $w = 15$

$e_5 = 0.048$

$DS = 50$



$\Delta = 0.034$



$L = 200(0.034)15 = \underline{102}$

$20\%\ L = 20.4$

BEGIN TRANS = (PCC) $53+01.44 - 20.4$

$52+81.04 \Rightarrow \underline{52+81}$

END TRANS = $52+81 + 102 = \underline{53+83}$

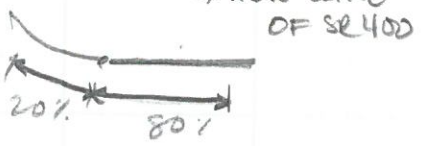
LL1-5

$R = 2330$ $R = 200$

$DS = 50$ $\Delta = 0.008$

$e = 0.048$ $w = 15$

$\Delta = 0.008$



$L = 200(0.008)15 = 24 \Rightarrow \underline{100'}$

$20\%\ L = 20$

BEGIN TRANS = (PT) $60+40.72 - 20$

$60+20.72 \Rightarrow \underline{60+20} \approx 2047+66.41$

END TRANS = $2047+66.41 - 100 = \underline{2046+66.41}$

Subject:

Comp by: Date: Sheet Number: 17

Check by: Job Number:

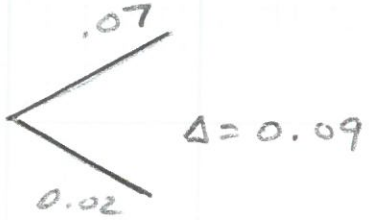
ATKINS

LL2-1

R = 1475 R = 200

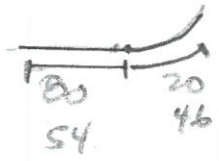
DS = 50 Δ = 0.09

e = 0.07 w = 15



L = 200(0.09) 15 = 270'

80% L = 216 ⇒ USE 54% to keep transition off bridge



54% L = 145.8

BEGIN TRANS = (PC) 17+45.27 − 145.8

= 15+99.47 ⇒ 16+00

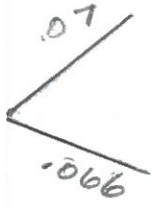
END TRANS = 16+00 + 270 = 18+70

LL2-1,2

R = 1615 R = 200

DS = 50 Δ = 0.136

e = 0.066 w = 15

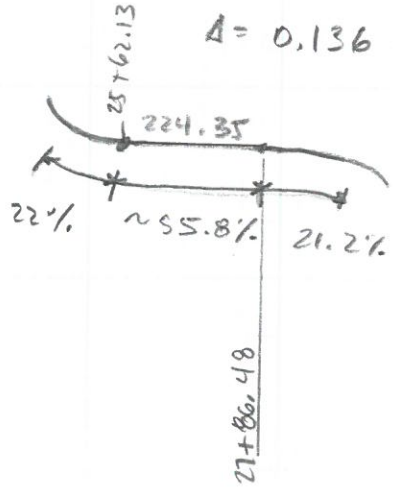


L = 200(0.136) 15 = 408

22% L = 89.76

BEGIN TRANS = (PT) 25+62.13 − 89.76

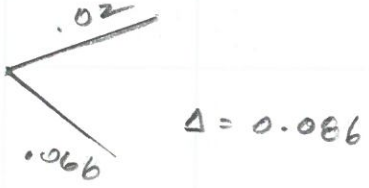
24+72.37 ⇒ 24+73



END TRANS = 24+73 + 408 = 28+81

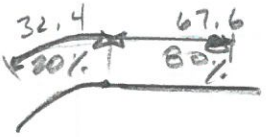
LL2 - 2

R = 1615 K = 200
D = 50 Δ = 0.086
e = 0.066 w = 15



L = 200 (0.086) 15 = 258

20%. L = 51.6



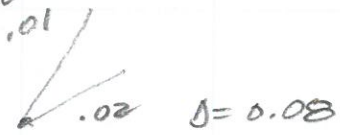
BEGIN TRANS = (PT) 32 + 04.75 - 51.6
= 31 + 53.59 => 31 + 53 ⇒ 31 + 17

END TRANS = 31 + 53 + 258 = 34 + 11 ⇒* 33 + 75

* Provide 100' @ 0.02 between LL2-2 and LL2-3

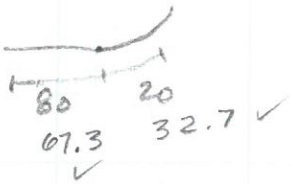
LL2 - 3

R = 716 K = 200
DS = 50 Δ = 0.08
e = 0.10 w = 15



L = 200 (0.08) 15 = 240'

80% L = 192



BEGIN TRANS = (PC) 36 + 36.41 - 192
= 34 + 44.41 => 34 + 45 ⇒* 34 + 75

END TRANS = 34 + 75 + 240 = 37 + 15

Subject:		
Comp by: / Check by:	Date: / Job Number:	Sheet Number: 19

ATKINS

U2-3

E = 716' R = 200

IS = 50 Δ = 0.13

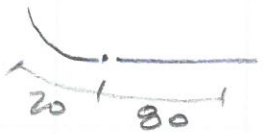
e = 0.10 w = 15

Δ = 0.13

$L = 200(0.13)15 = \underline{390'}$

20%. L = 78

* Provide 0.03 to match gore OD RAMP NNI



BEGIN TRANS: 46+86.33 − 78

= 46+08.33 → <u>46+08</u>

END TRANS = 46+08 + 390 = <u>49+98</u>

Subject:

Comp by: Date: Sheet Number: 20

Check by: Job Number:

ATKINS

LL3-1

R = 3200' R = 200

DS = 50 Δ = 0.017

e = 0.037 w = 24

Δ = 0.017

L = 200(0.017)(24)

= 81.6 ⇒ 100' MIN.

80%L = 80'

BEGIN TRANS = (PC) 10+87.23 − 80

= 10+07.23 ⇒ 10+08

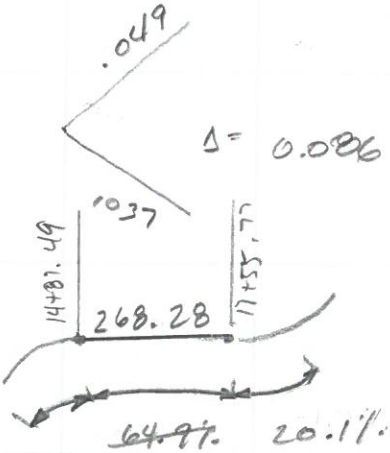
END TRANS = 10+08 + 100 = 11+08

LL3-1, 2

R = 2292 R = 200

DS = 50 Δ = 0.086

e = 0.049 w = 24



L = 200(0.086)24 = 412.8 ⇒ 413'

L = 268.28 / 0.6 = 447.1 ⇒ 448' ← use *

20%L = 89.6

BEGIN TRANS = (PT) 14+87.49 − 89.6

= 13+97.89 ⇒ 13+98

END TRANS = 13+98 + 448 = 18+46

* Increase trans. length to provide 60% of davit transition on tangent between curves.

Subject:

Comp by: Date: Sheet Number: 21

Check by: Job Number:

ATKINS

LL 3- 2, 3

R = 5754

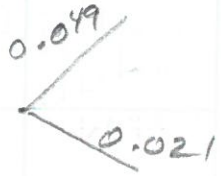
DS = 50

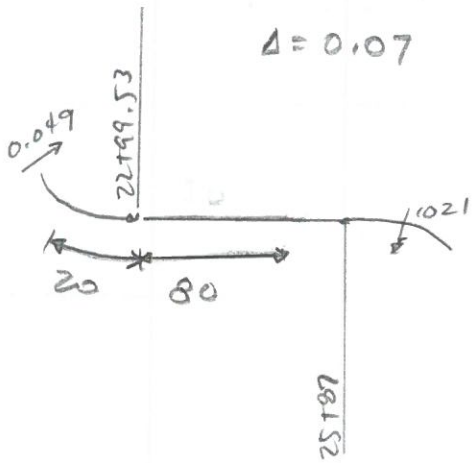
e = 0.0209 ⇒ 0.021

R = 200

Δ = 0.07

W = 15





L = 200(0.07) 15 = 210'

20% L = 42

BEGIN TRANS = (PT) 22+99.53 − 42

= 22 +57.53 ⇒ 22+57

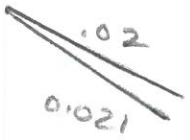
END TRANS = 22 + 57 + 210 = 24+67

LL 3 - 3

R = 5754 R = 200

DS = 50 Δ = 0.001

e = 0.021 W = 24



Δ = .001

L = 200(0.001)24 = 4.8 ⇒ 100' MIN

20% L = 20'

BEGIN TRANS = (PT) 37 + 23.09 − 20 =

= 37 +03.09 ⇒ 37 +00

Arbitrary round down to even station.

END TRANS = 37+00 + 100 = 38 +00

Subject: RAMP MM1		
Comp by: / Check by:	Date: / Job Number:	Sheet Number: 22

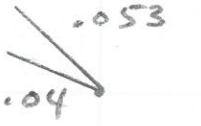
ATKINS

MM1 - 1

$R = 2084$ $R = 200$

$DS = 50$ $\Delta = 0.013$

$e = 0.053$ $W = 15$



$\Delta = 0.013$

$L = 200(0.013)15$

$= 39 \Rightarrow \underline{100'}$

$80\% L = 80$

BEGIN TRANS: (PC) $17+85.74 - 80$

$= 17+05.74 \Rightarrow \underline{17+06}$

END TRANS: $17+06 + 100 = \underline{18+06}$

MM1 - 1,2

$R_1 = 2084$ $R = 200$

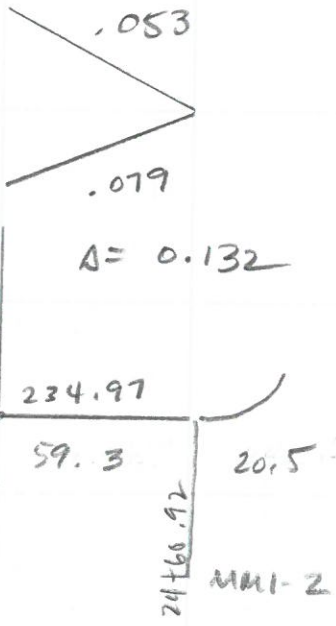
$e_1 = 0.053$ $\Delta = 0.151$

$R_2 = 1244$ $W = 15$

$e_2 = 0.079$ $DS = 50$

$L = 200(0.132)15 = \underline{396}$

$20.2\% L = 80$



BEGIN TRANS: (PC) $22+25.95 - 80$

$= 2145.95 \Rightarrow \underline{21+45}$

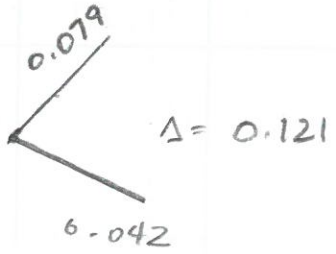
END TRANS: $21+45 + 396 = \underline{25+41}$

MM1 - 3 R = 2765' e = 0.042 (BASELINE SHIFT)

R = 200

Δ =

W = 24

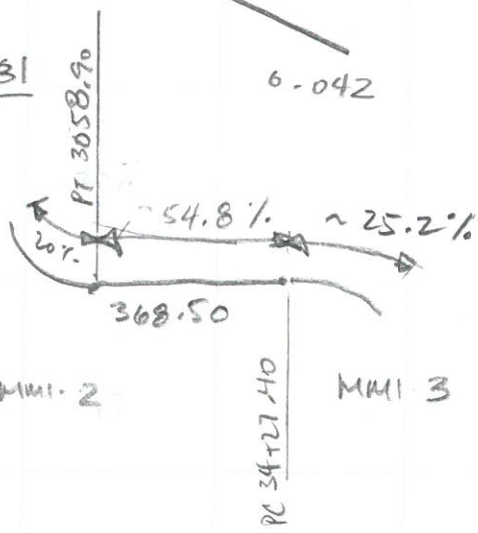


L = (200)(0.121)(24) = 580.8 = 581

20%L = 116.2

BEGIN TRANS = (PT) 30+58.90 - 116.2

= 29+42.7 ⇒ 29+42



END TRANS: 29+42 + 581

= 35+23

$e_{32+50} = -.079 + \frac{0.121}{581}(32+50 - 29+42) = -0.015$

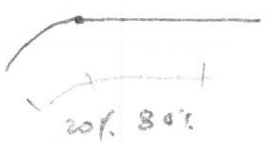
MM1-3 R = 2765' e = 0.042

R = 200

Δ = 0.022

W = 24'

L = (200)(0.022)(24) = 105.6' ⇒ 106'



20%L = 21.2

BEGIN TRANS = (PT) 40+08.45 - 21.2

= 39+87.25 ⇒ 39+87

END TRANS. = 39+87 + 106 = 40+93

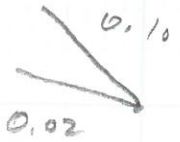
Subject:

Comp by: Date: Sheet Number: 24

Check by: Job Number:

ATKINS

MM1 - 4,5 R = 333' e = 0.10



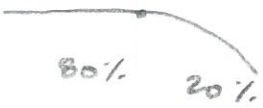
$\Delta = 0.08$

R = 175 DS = 35 mph

$\Delta = 0.08$

W = 15

L = 175 (.08)(15) = 210'



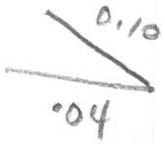
80%.L = 168'

BEGIN TRANS. = 57 + 21.30 - 168

= 55 + 53.3 => 55 + 54

END TRANS = 55 + 54 + 210 = 57 + 64

MM1 - 5



$\Delta = 0.06$

R = 175

$\Delta = 0.06$

W = 15

L = 175(0.06) 15 = 157.5 => 158'

20%.L = 31.6

BEGIN TRANS. = 71 + 42.32 - 31.6

= 71 + 11.72 => 71 + 11

END TRANS. = 71 + 11 + 158 = 72 + 69

* PROVIDE 0.04 TO MATCH AUX LANE AT SR 429

Subject:

Comp by: Date: Sheet Number: 25

Check by: Job Number:

ATKINS

MM2-1 R= 819 DS=50 mph e= 0.098

R= 200

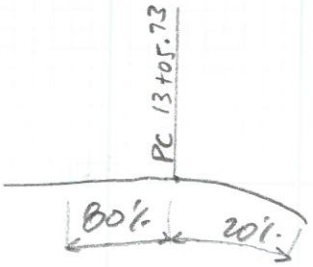
Δ= 0.078

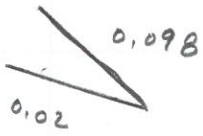
w= 15

L_{req} 200(0.078)15 = 234'

Length of taper = 305.73

$L_{prov} = \frac{305.73}{80\%} = 382.1 \Rightarrow \underline{383'}$ *





Δ= 0.078

* ARBITRARILY INCREASE transition length to transition thru entire length of exit taper. 80% of total length on exit taper.

BEGIN TRANS= 10+00

END TRANS= 10+00 + 383 = 13+83

R= 200

Δ= 0.078

w = 15

L= 200(0.078) 15 = 234

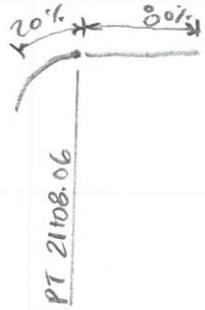
20% L= 46.8

Δ= 0.078

BEGIN TRANS. = (PT) 21+08.06 - 46.8

= 20+61.26 ⇒ 20+61

END TRANS = 20+01 + 234 = 22+95



Subject:

Comp by: Date: Sheet Number: 26

Check by: Job Number:

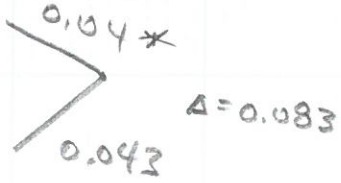
ATKINS

MM3-1, 2

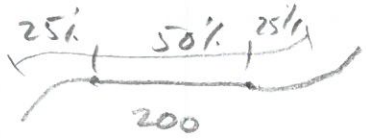
$R = 200$

$\Delta = 0.083$

$w = 24'$



$L = 200(.083)24 = 398.4 \Rightarrow 400'$



25% L = 100'

BEGIN TRANS = 18+07.23 − 100'

= 17+07.23 ⇒ 17+07

END TRANSITION = 17+07 + 400 = 21+07

* MATCHES CROSS SLOPE OF SE400 AUX LANE AND SUITABLE FOR DS = 50

MM3-2, 3

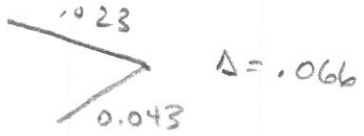
$R = 200$

$\Delta = 0.066$

$w = 24$

$R = 5328.4$

$e = 0.0228 \Rightarrow 0.023$

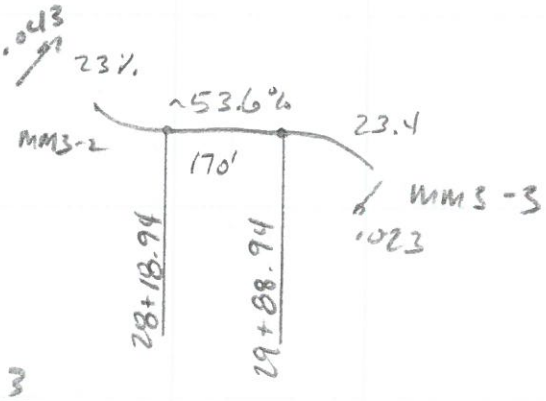


$L = 200(.066)24 = 316.8 \Rightarrow 317'$

23% L = 72.91

BEGIN TRANS = 28+18.94 − 72.91

= 27+46.03 ⇒ 27+46



END TRANS = 27+46 + 317 = 30+63

Subject:

Comp by: Date: Sheet Number: 27

Check by: Job Number:

ATKINS

MM3 - 3,4

R = 200 R = 22,958'

Δ = 0.003

W = 24

L = 200 (0.003) 24 = 14.4 ⇒ 100' MIN.

Δ = 0.003

20% L = 20'

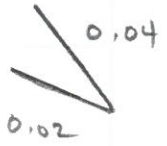
BEGIN TRANS = 34+87.73 - 20'

= 34+67.73 ⇒ 34+67

END TRANS = 34+67 +100 = 35+67

MM3-5 NC

MM3-6



Δ = 0.02

R = 200 R = 2865'

Δ = 0.02

W = 24

L = 200 (0.02)(24) = 96 ⇒ 100' MIN.

80% L = 80'

BEGIN TRANS = 51+89.37 - 80

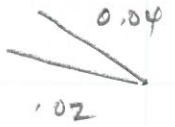
= 51+09.37 ⇒ 51+10

END TRANS = 51+10 +100 = 52+10

Subject:		Sheet Number: 28
Comp by: / Check by:	Date: / Job Number:	

ATKINS

MM3-6



Δ = 0.02

R = 200
Δ = 0.02
W = 24

L = 200(0.02) 24 = 96 ⇒ 100' MIN

20% L = 20

BEGIN TRANS. = (PT) 55 + 67.69 − 20
= 55 + 47.69 ⇒ 55 + 47

END TRANS = 55 + 47 + 100 = 56 + 47

NN1-3

RADIUS = 5730
DS = 50
e = 0.021 required

R

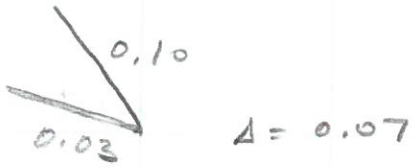
Provide 0.03 thru curve and tangent between NN1-4 and gore to avoid multiple short transitions and provide more slope along 3-lane ramp section

NN1-4 R = 716 DS = 50 mph e = 0.10

R = 200

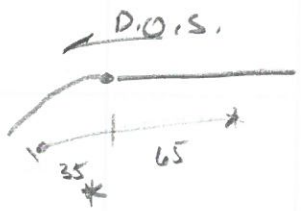
Δ = 0.07

W = 24



L = 200(0.07)24 = 336

65% L = 218.4



BEGIN TRANS = 46 + 06.40 − 218.4
= 43+88

END TRANS = 43+88 + 336 = 47+24

* Use 35% to provide < 6% rollover between adjacent lanes on LL2 and NN1

Subject:

Comp by: Date: Sheet Number: 30

Check by: Job Number:

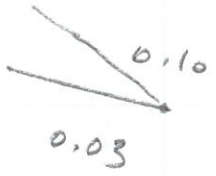
NN1-5

R = 5730

DS = 50

e_{req} = 0.021 e = 0.03 provided

Provide 0.03 thru curve and tangent between NN1-4 and tangent and across bridge to match gore and eliminate multiple slant transitions.



Δ = 0.07

R = 200

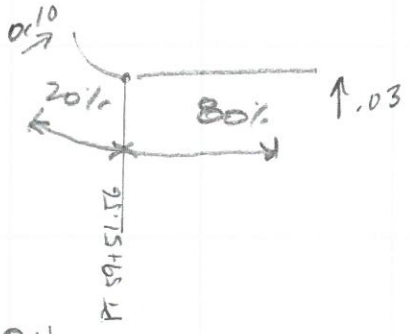
Δ = 0.07

w = 24

L = 200(0.07)24

L = 336

20%.L = 67.2



BEGIN TRANS = (PT) 59 + 51.56 − 67.2

= 58 + 84.36 ⇒ 58 + 84

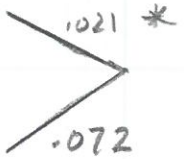
END TRANS = 58 + 84 + 336 = 62 + 20

NN2-4

R = 1447 I2 = 200
DS = 50 Δ = 0.093
e = 0.072 w = 15

NN2-3

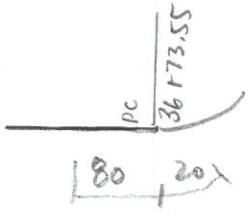
L = 5730
DS = 50
e = 0.021



Δ = 0.093

$L = 200(0.093)\,15 = 279'$

80% L = 223.2



BEGIN TRANS: 36 + 73.55 - 223.2
= 34 + 50.35 ⇒ 34+51

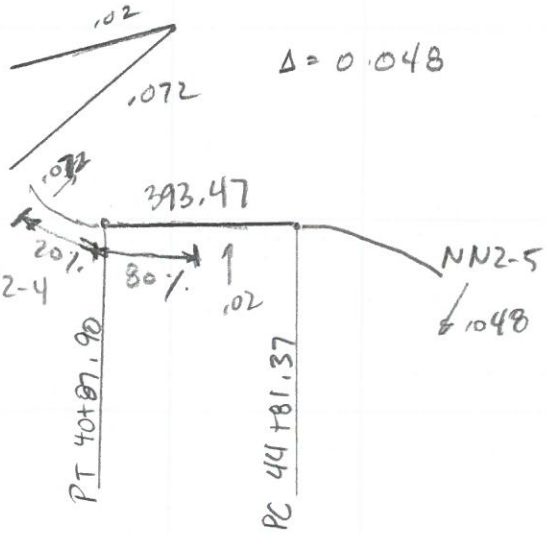
END TRANS = 34+51 + 279 = 37+30

* PROVIDE 0.021 ALONG tangent between NN2-3 and NN2-3 to avoid unnecessary transition

I2 = 200
Δ = 0.048
w = 15

$L = 200(0.048)\,15 = 144$

20% L = 28.8



BEGIN TRANS = (PT) 40 + 87.90 - 28.8
= 40 + 59.1 ⇒ 40+59

END TRANS = 40 + 59 + 144 = 42+03

Subject:		
Comp by: / Check by:	Date: / Job Number:	Sheet Number: 32

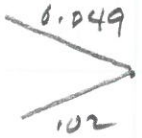
ATKINS

NN2 - 5

R = 2292 R = 200

DS = 56 Δ = 0.069

e = 0.049 w = 15



Δ = 0.069

L = 200(0.069) 15 = 207'

80% L = 165.6

BEGIN TRANS = 44 + 81.37 - 165.6

= 43 + 15.77 ⇒ 43 + 16

END TRANS = 43+16 + 207 = 45+22

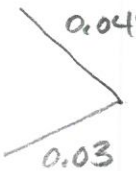
R = 200

Δ = 0.079

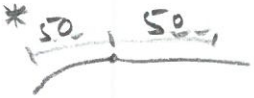
w = 15

L = 200(0.079)15 = 237'

50% L = 118.5



Δ = 0.079



BEGIN TRANS = (PT) 49+79.98 - 118.5

= 48+61.48 ⇒ 48+62

END TRANS = 48+62 + 237 = 50+99

* USE 50/50 transition spiral to keep elevs and grades up to facilitate profile between bridges

Subject:

Comp by: Date: Sheet Number: 23

Check by: Job Number:

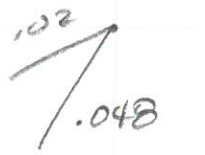
ATKINS

001-1

R = 2889 R = 200

DS = 55 Δ = 0.028

e = 0.048 W = 24'



Δ = 0.028

L = 200 (.028) 24 = 134.4 ⇒ 135

80% L = 108

BEGIN TRANS = (PC) 134 + 14.56 − 108

= 133 + 06.56 ⇒ 133+07

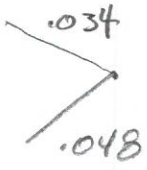
END TRANS = 133+07 + 135 = 134+42

001-1,2

R = 4170 R = 200

DS = 55 Δ = 0.082

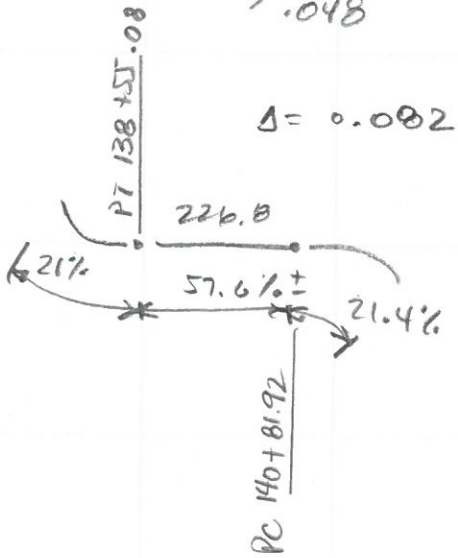
e = 0.034 W = 24



L = 200 (.082) 24 = 393.6 ⇒ 394'

Δ = 0.082

21% L = 82.74'



BEGIN TRANS: (PT) 138 + 55.08 − 82.74

= 137+72.34 ⇒ 137+73

END TRANS: 137+73 + 394 = 141+66

Subject:

Comp by: Date: Sheet Number: 34

Check by: Job Number:

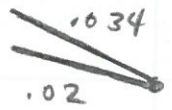
ATKINS

001 - 2,3

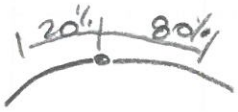
R= 8340 e=200

DS= 55 Δ = 0.014

e= RC W= 24



Δ = 0.014



L= 200(0.014)24 = 67.2 => 100

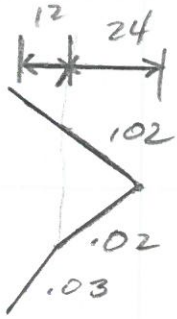
20%. L = 20

BEGIN TRANS: (PCC) 144 + 81.71 - 20

= 144 + 61.71 => 144 + 60

END TRANS = 144 + 60 + 100 = 145 + 60

001 - 3,4



R= 11495 R=200

DS= 55 y= 1.56

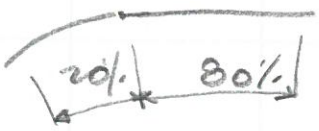
e= NC

$y = .02(36) + .02(24) + .03(12)$

$= 1.56$

L= 200 (1.56) = 312

20%. L = 62.4



BEGIN TRANS = (PRC) 157 + 41.70 - 62.4

156 + 79.3 => 156 + 79

END TRANS = 156 + 79 + 312 = 159 + 85

Subject:

Comp by: Date: Sheet Number: 35

Check by: Job Number:

ATKINS

001 - 6

R = 11328

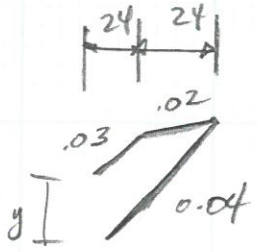
DS = 55

001 - 5

R = 200

y = 0.72'

e = NC



L = 200 (0.72) = 144'

$y = (.04)48 - .02(24) - .03(24)$

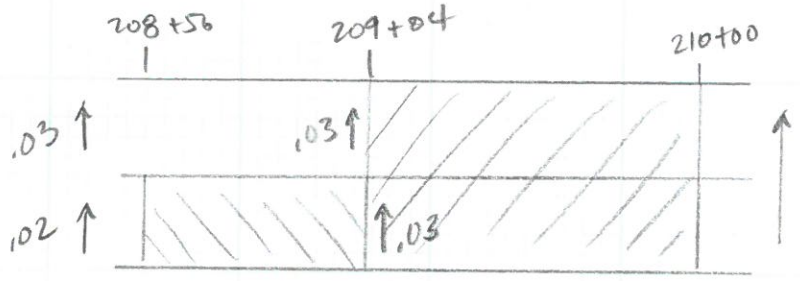
$= 1.92 - 1.2 = 0.72$

END TRANSITION @ 210+00 *

PT STA 210 + 06.89

BEGN TRANS: 210+00 - 144 = 208+56

* END SET AT EVEN STATION NOMINAL DISTANCE FROM BORE



$L_1 = 200(.01)24$

$= 48$

$L_2 = 200(.01)48$

$= 96$

003 - 1

R = 4584

DS = 50

e = 0.026 required

0.036 provided to match SR 429 and eliminate additional transition

003-2

R = 955 R = 200

DS = 50 Δ = 0.056

e = 0.092 W = 24 (varies)

Δ = 0.056

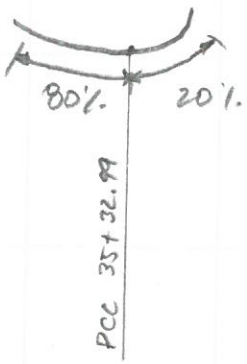
L = 200 (0.056) 24 = 268.8 ⇒ 270'

80% L = 216

BEGIN TRANS = (PCC) 35 + 32.99 - 216

= 33 + 16.99 ⇒ 33 + 17

END TRANS = 33+17 + 270 = 35 + 87



Subject:		
Comp by: / Check by:	Date: / Job Number:	Sheet Number: 37

ATKINS

003-2

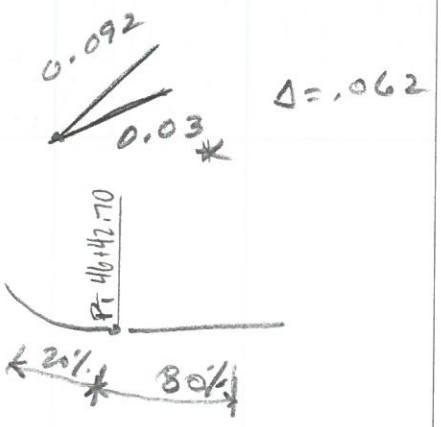
R= 955 R= 200

DS= 50 Δ = 0.062

e= 0.092 w = 15

$L = 200(0.062) - 15 = 186'$

20% L = 37.2



BEGIN TRANS = (PT) 46+42.70 − 37.2

= 46+05.5 ⇒ 46+05

END TRANS = 46+05 + 186 = 47+91

* Provide 0.03 to match 001 cross slope and avoid unnecessary transition

Subject:

Comp by: Date: Sheet Number: 38

Check by: Job Number:

ATKINS

004-2

L = 420'
DS = 35
e = 0.095

R = 175
Δ = 0.065
W = 15

Δ = 0.065

$L = 175(0.065)15 = 170.6 \Rightarrow \underline{171}$

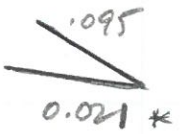
80%. L = 136.8

BEGIN TRANS = (PC) 10+68.31 − 136.8 =
= 9+31.51 ⇒ 9+32

END TRANS = 9+32 + 171 = 11+03

004-2, 3, 4

004-4 − R = 3300' R = 175
DS = 35 Δ = 0.074
e = RC W = 15



Δ = 0.074

$L = 175(0.074)15 = 194.25 \Rightarrow \underline{195'}$

20%. L = 39'

BEGIN TRANS = 26+98.98 − 39
= 26+59.98 ⇒ 26+60

END TRANS = 26+60 + 195 = 28+55

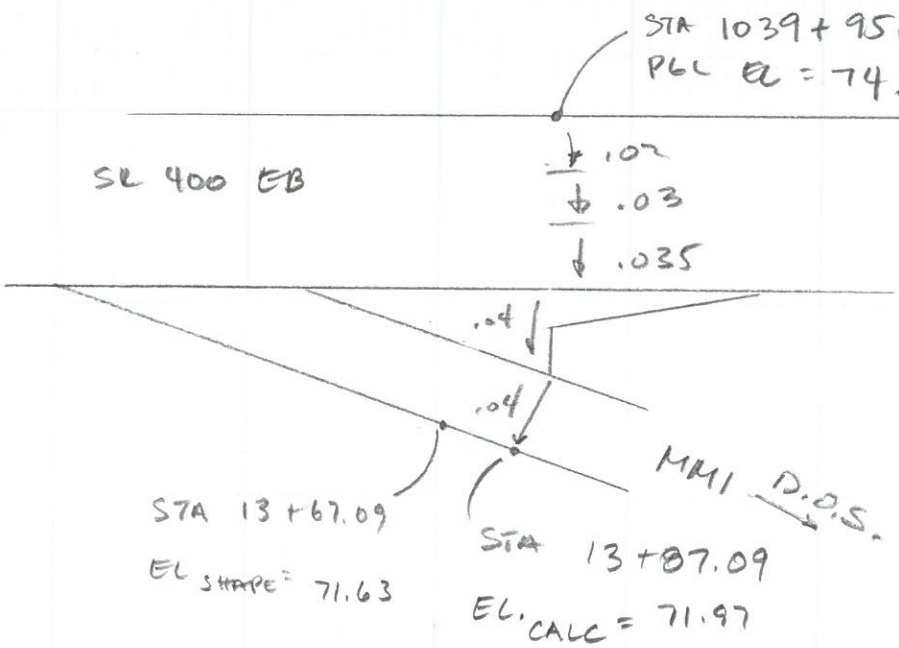
* Use 0.021 to match LL3

Section 6 – Ramp Terminal Details

Subject: RAMP TERMINAL DETAILS		
Comp by: / Check by:	Date: / Job Number:	Sheet Number:

ATKINS

SR 400 EB, MM1



$EL_{CALC} = 74.35 - 12(.02 + 0.03 + .035) - 0.04(19 + 15) = \underline{71.97}$

$GRADE = \frac{71.97 - 71.63}{20} = +0.017 = \underline{+1.7\%}$

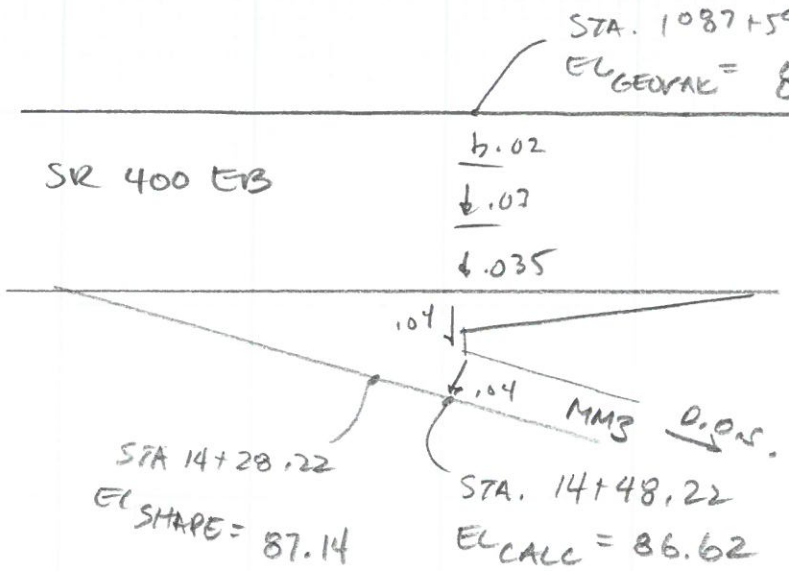
Subject: RAMP TERMINAL DETAILS

ATKINS

Comp by: | Date: | Sheet Number:

Check by: | Job Number:

SR 400 EB, MM3



$EL_{CALC} = 89.36 - 12(0.02 + 0.03 + 0.035) - 0.04(19 + 24) = 86.62$

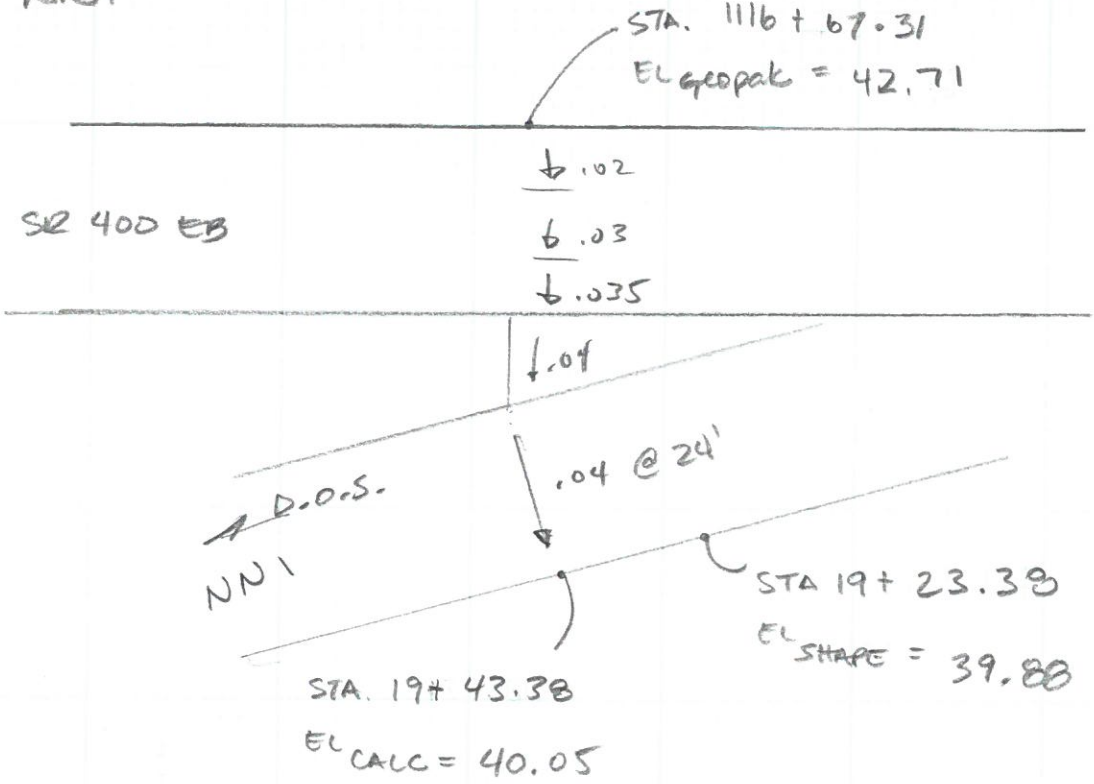
$GRADE = \frac{86.62 - 87.14}{20} = -0.026 = -2.6\%$

Subject: RAMP TERMINAL DETAILS

ATKINS

Comp by:	Date:	Sheet Number:
Check by:	Job Number:	

SR 400 EB, NN1



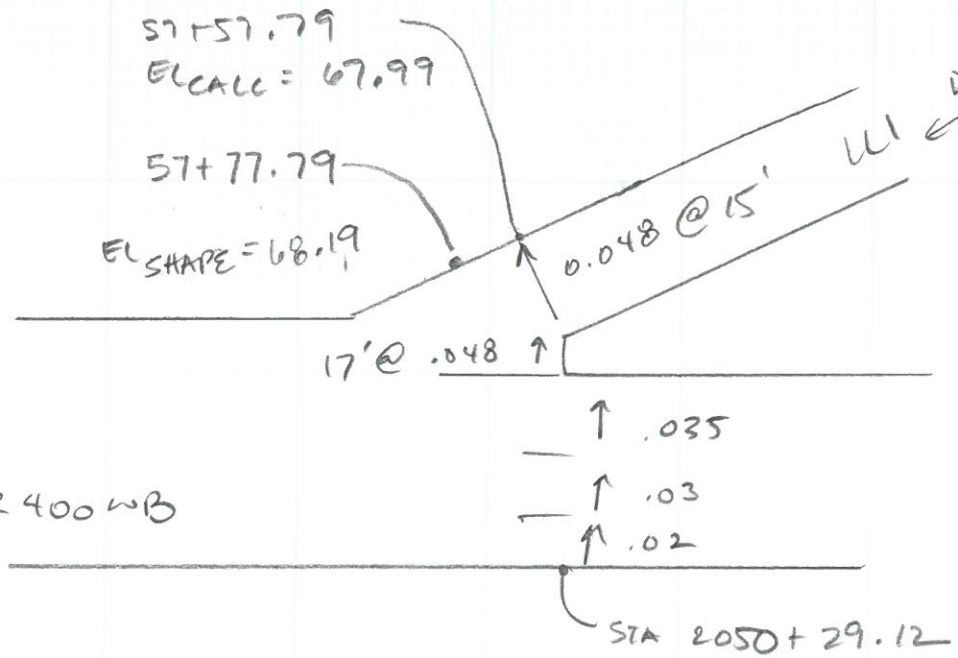
$EL_{CALC} = 42.71 - 12(.02 + 0.03 + 0.035) - .04(17 + 24) = \underline{40.05}$

$GRADE = \frac{40.05 - 39.88}{20} = +0.0085 = \underline{+0.85}$

Subject: RAMP TERMINAL DETAILS		
Comp by: / Check by:	Date: / Job Number:	Sheet Number:

ATKINS

SR 400 WB, LC1



$EL_{CALC} = 70.55 - 12(0.02 + .03 + .035) - .048(17+15)$

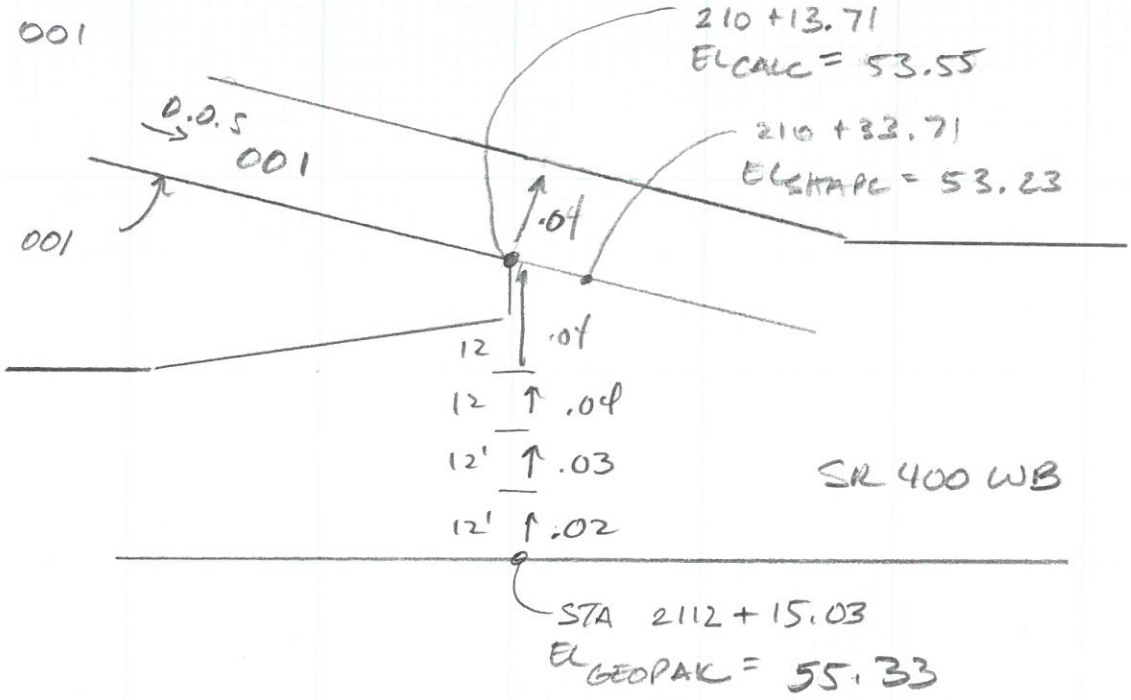
$= 70.55 - 1.02 - 1.54 = \underline{67.99}$

$GRADE = \frac{68.19 - 67.99}{20} = +0.01 = \underline{+1\%}$

Subject: RAMP TERMINAL DETAILS		
Comp by: / Check by:	Date: 3-9-16 / Job Number:	Sheet Number:

ATKINS

SR 400 WB, 001



$EL_{CALC} = 55.33 - 12(.02 + .03 + .035) - 0.04(19)$

$= 55.33 - 1.02 - 0.76 = \underline{53.55}$

$GRADE = \frac{53.23 - 53.55}{20} = -0.016 = \underline{-1.6\%}$

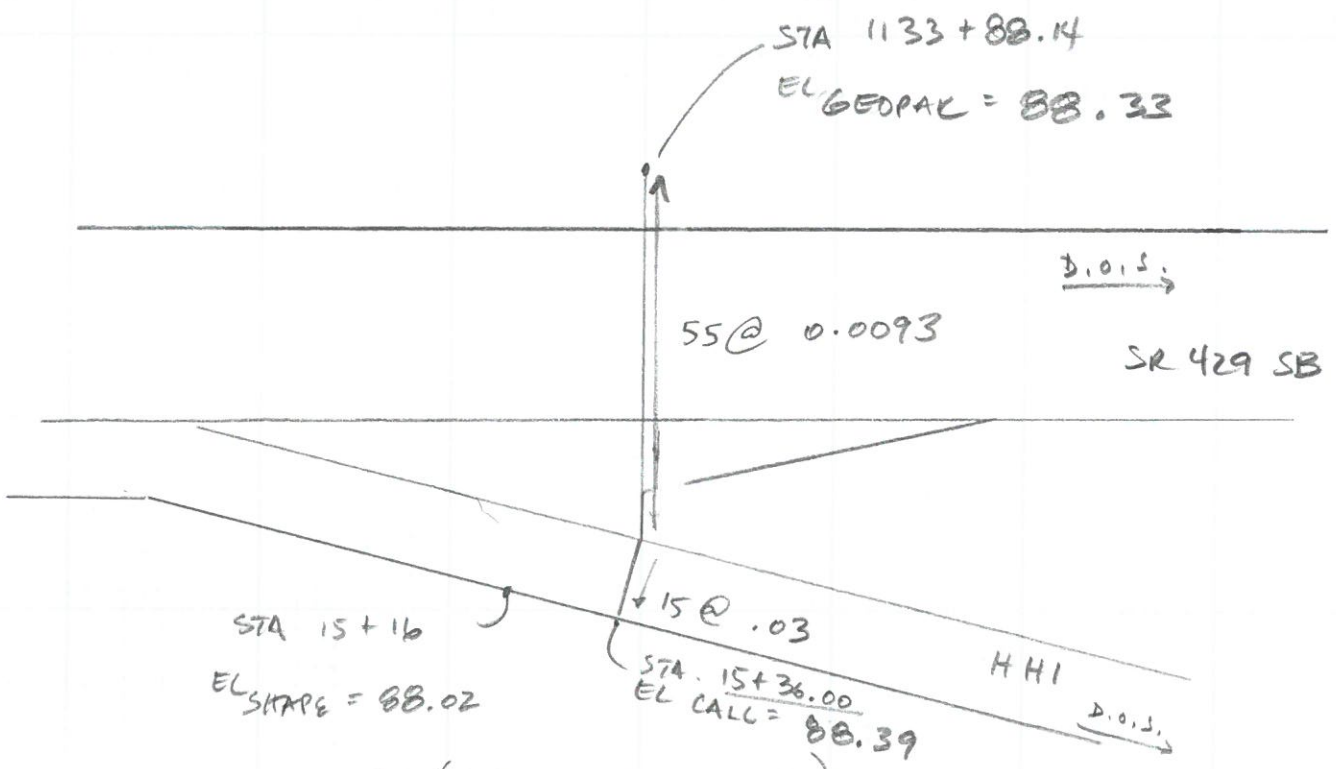
Subject: RAMP TERMINAL DETAILS

ATKINS

Comp by: | Date: | Sheet Number:

Check by: | Job Number:

SR 429 SB, HH1



$e_{1133+88.14} = -0.233 + \frac{.059}{428}(113388.14 - 1131+53)$

$= +0.0093$

$EL_{CALC} = 88.33 + 55(0.0093) - 15(0.03)$

$= 88.39$

$GRADE = \frac{88.39 - 88.02}{20} = +0.0186 = +1.86\%$

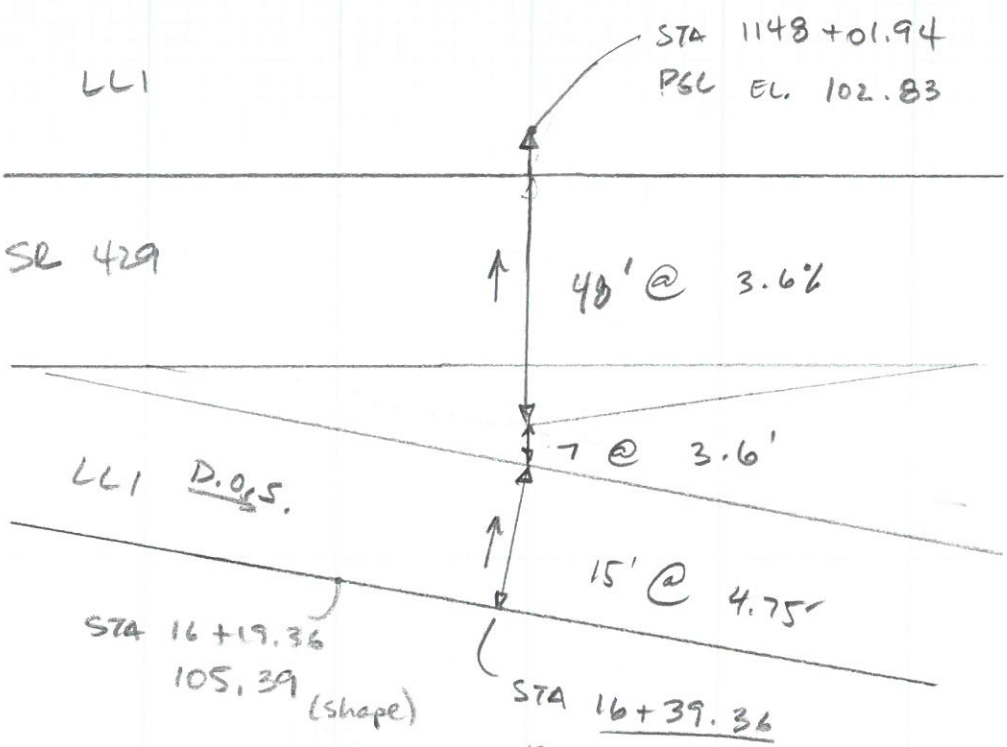
.036
.02
.03
.0233
Δ = 0.0593
-1.05%

Subject: RAMP TERMINAL DETAILS
SR 429 SB, LL1

ATKINS

Comp by: | Date: | Sheet Number:
Check by: | Job Number:

SR 429 LL1



$PGL_{LL1} = 102.83 + 55(0.036) + 15(.0475)$

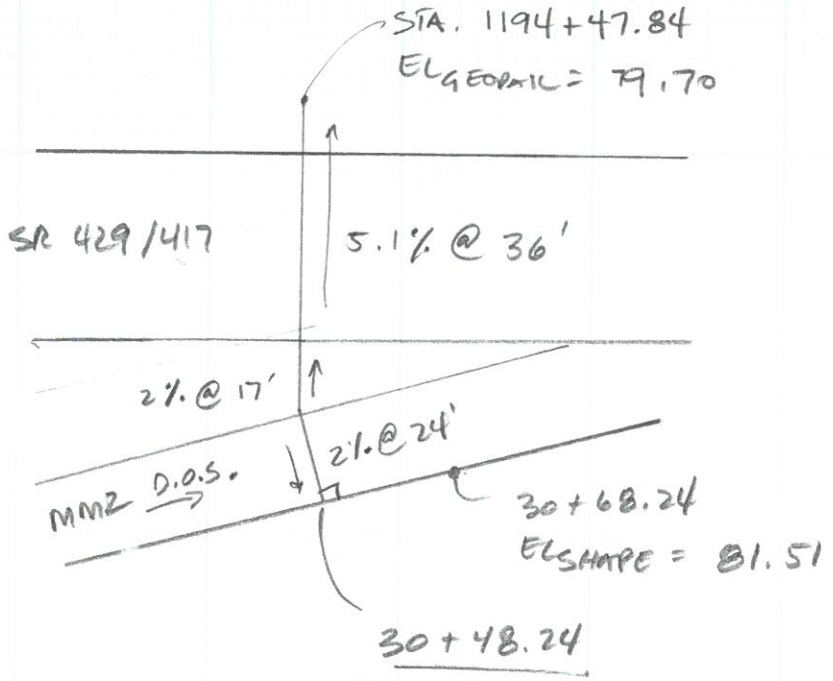
$= 105.52$

Grade $= \frac{105.52 - 105.39}{20} = +0.0065 = +0.65\%$

Subject: RAMP TERMINAL DETAILS		
Comp by: / Check by:	Date: / Job Number:	Sheet Number:

ATKINS

SR 429 SB, MM2



$EL_{CALC} = 79.70 + 0.051(36) + .02(17) - .02(24)$

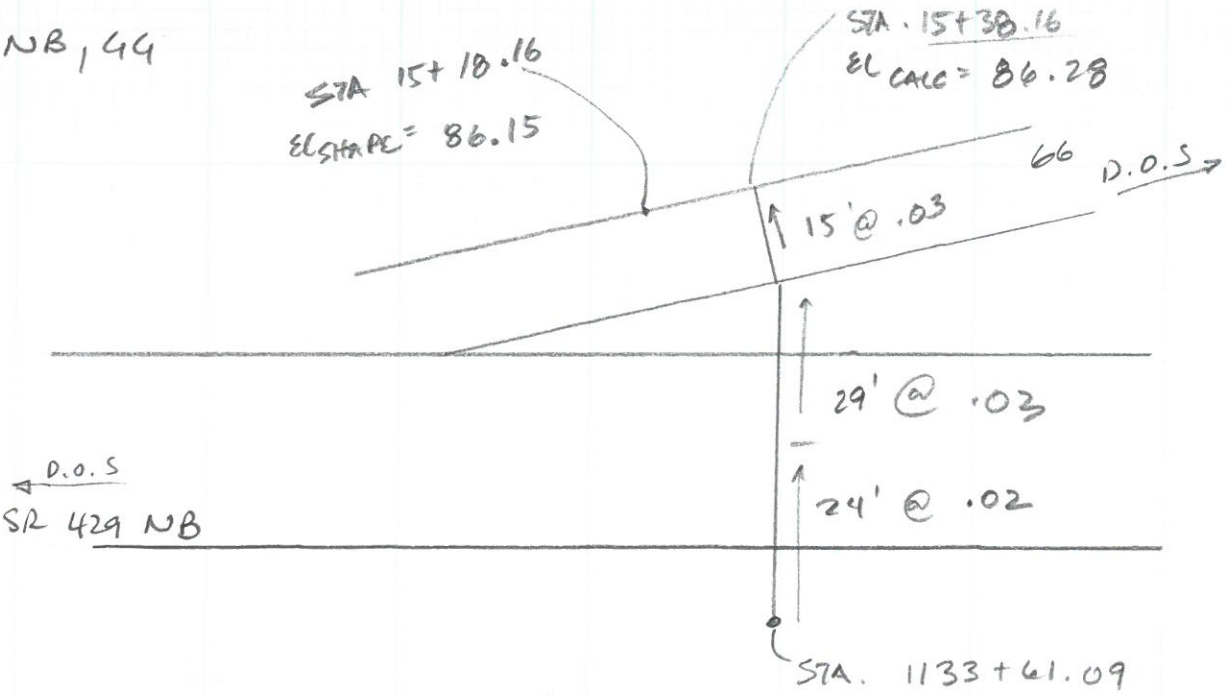
$= \underline{81.40}$

$GRADE = \dfrac{81.51 - 81.40}{20} = +0.0055 = \underline{+0.55\%}$

Subject: RAMP TERMINAL DETAILS		
Comp by: / Check by:	Date: / Job Number:	Sheet Number:

ATKINS

SR 429 NB, GG



$EL_{CALC} = 88.08 - 24(.02) - 29(.03) - 15(.03)$ $EL_{GEOPHIC} = 88.08$

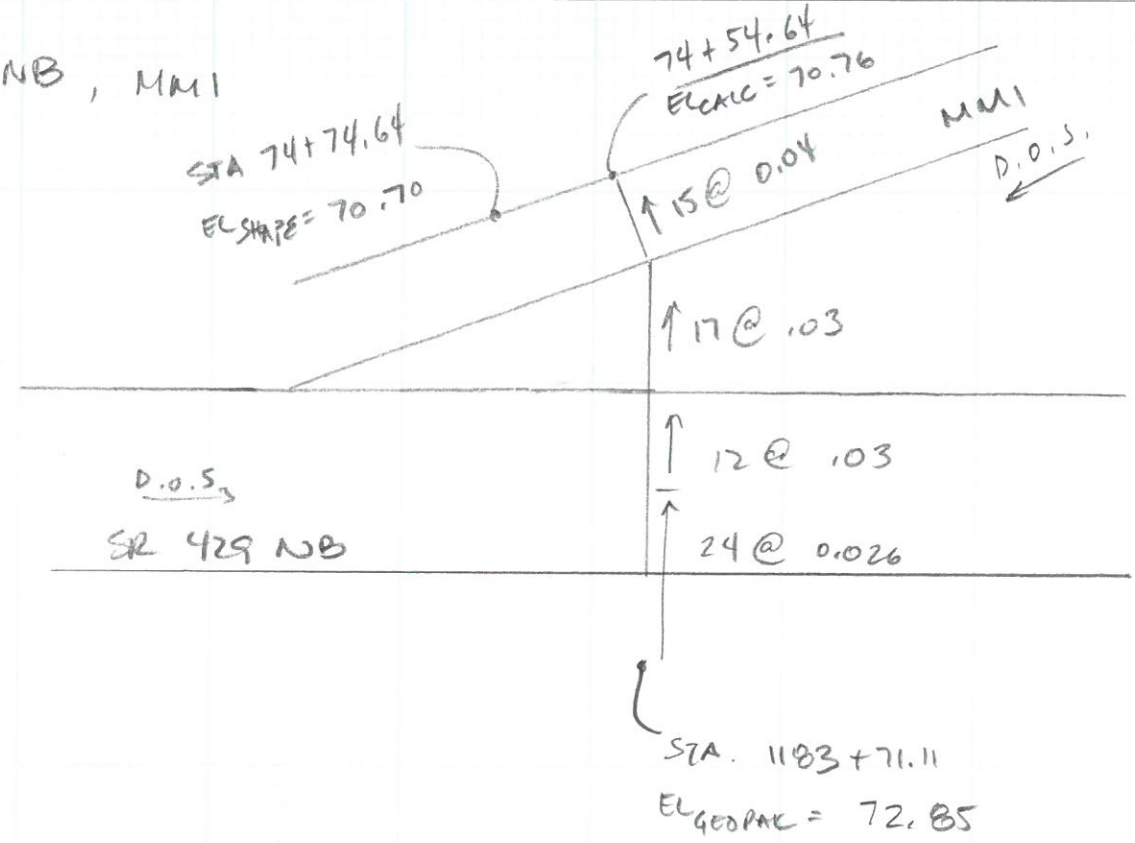
$= 86.28$

$$\text{GRADE} = \frac{86.28 - 86.15}{20} = +0.0065 = +0.65\%$$

Subject: RAMP TERMINAL DETAILS		
Comp by: / Check by:	Date: / Job Number:	Sheet Number:

ATKINS

SR 429 NB, MM1



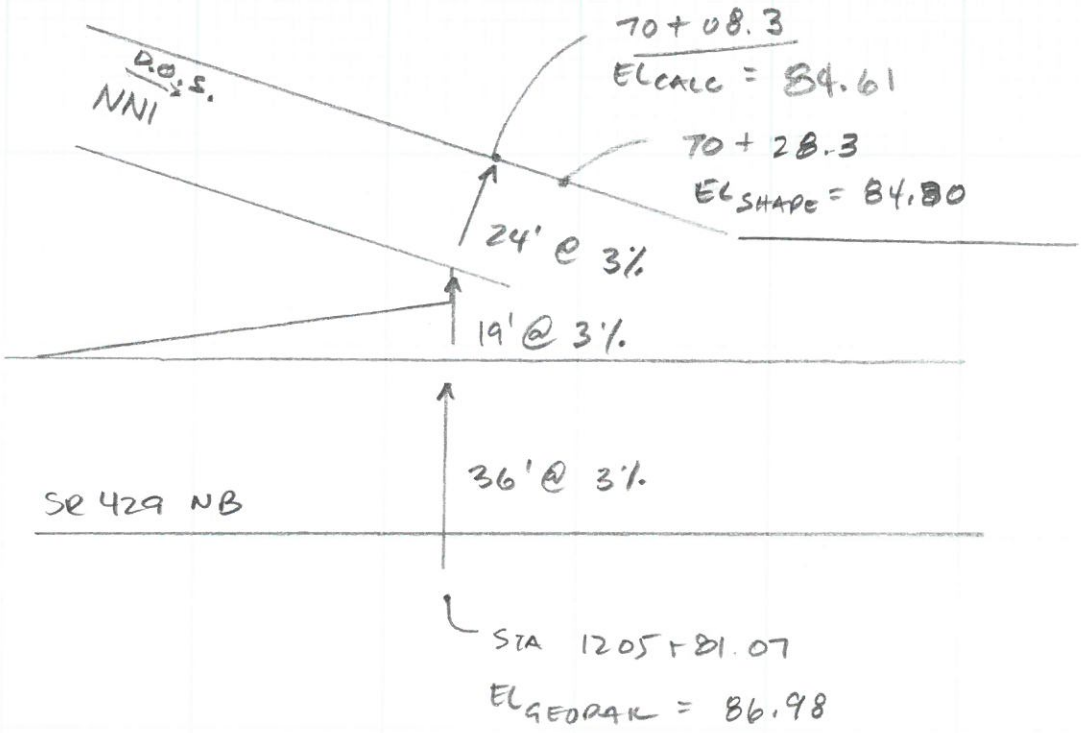
$$EL_{CALC} = 72.85 - 24(0.026) - (12+17)(.03) - 15(.04) = \underline{70.76}$$

$$GRADE = \frac{70.70 - 70.76}{20} = -0.003 = \underline{-0.3\%}$$

Subject: RAMP TERMINAL DETAILS		
Comp by: / Check by:	Date: / Job Number:	Sheet Number:

ATKINS

SR 429 NB, NN1



$EL_{CALC} = 86.98 - 0.03(36 + 19 + 24)$

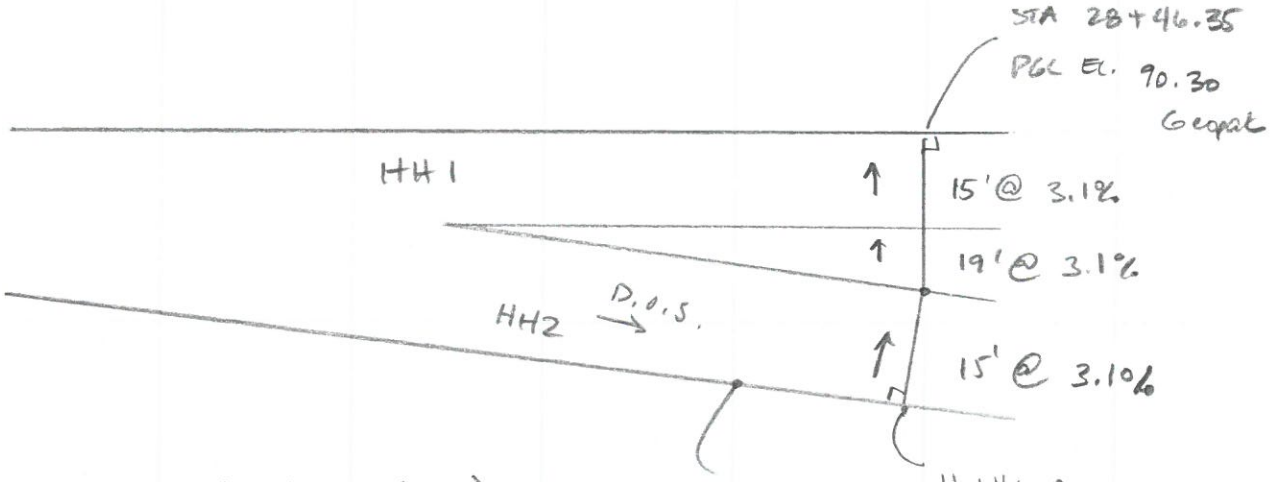
$= 84.61$

$GRADE = \frac{84.80 - 84.61}{20} = +0.0095 = +0.95\%$

Subject: RAMP TERMINAL DETAILS		
Comp by: / Check by:	Date: / Job Number:	Sheet Number:

ATKINS

HH1, HH2



PGL_{HH2} : 90.30 + 34(.031) + 15(.031)

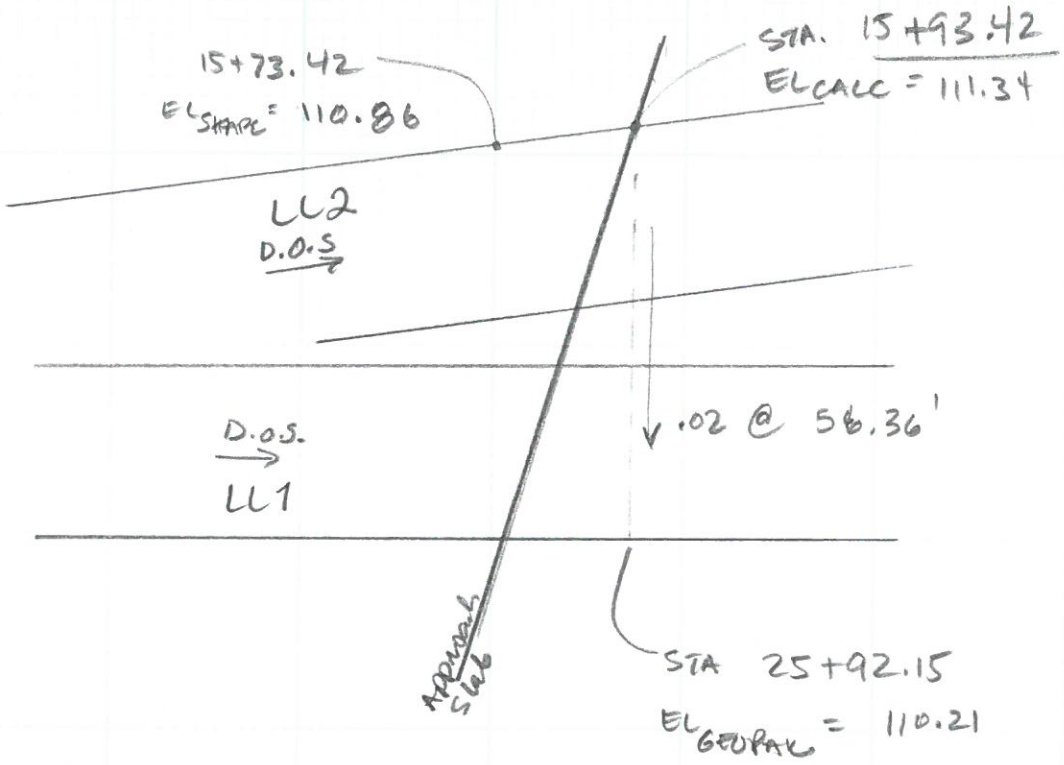
= 91.82

GRADE = $\frac{91.82 - 92.09}{20} = -0.0135 \Rightarrow -1.35\%$

Subject: RAMP TERMINAL DETAILS		
Comp by: / Check by:	Date: / Job Number:	Sheet Number:

ATKINS

LL1 , LL2

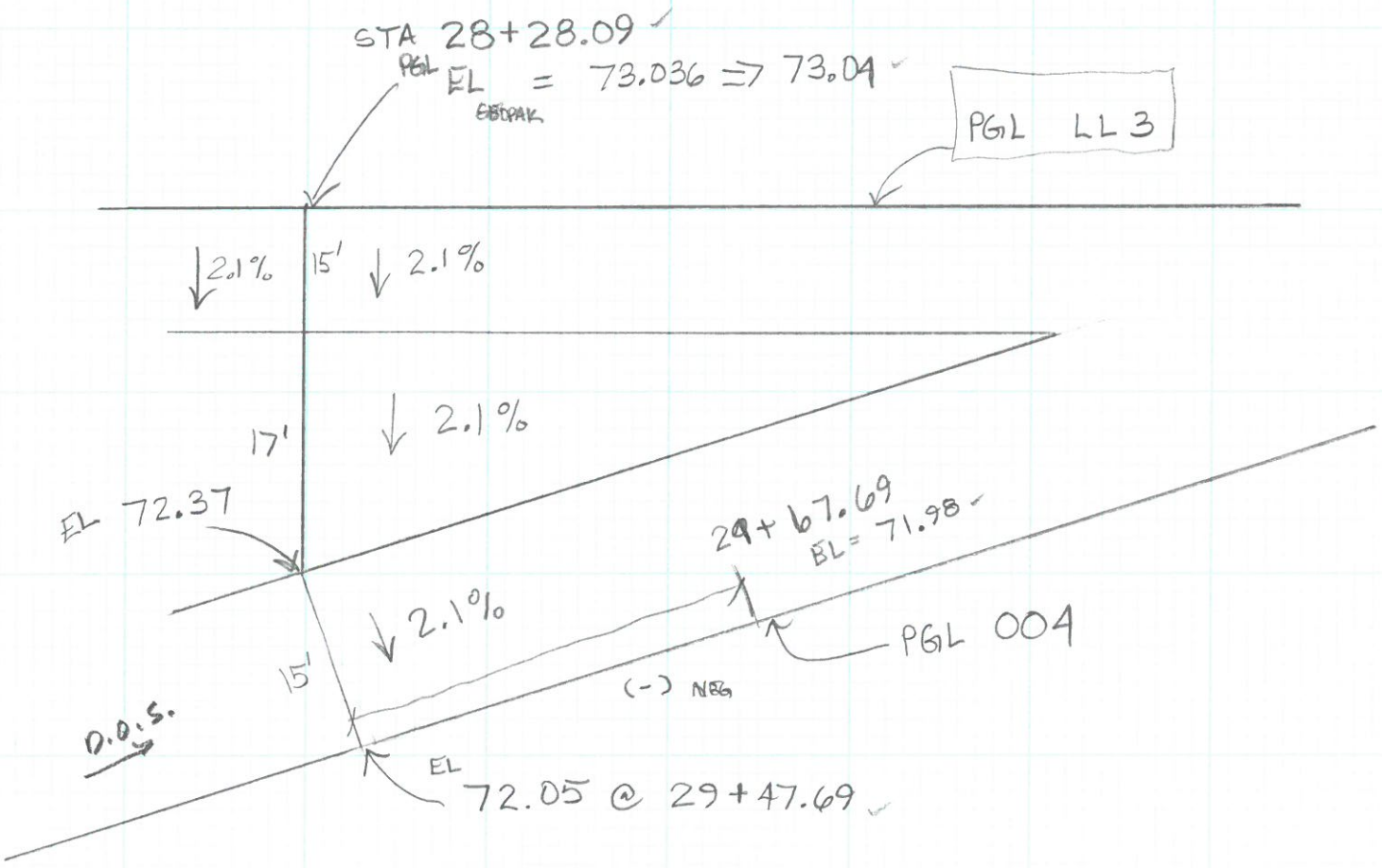


$EL_{CALC} = 110.21 + .02(56.36) = \underline{111.34}$

$GRADE = \dfrac{111.34 - 110.86}{20} = +0.024 = \underline{+2.4\%}$

Subject: RAMP LL3 + 004 GORE CALCS		
Comp by: ABW	Date: 2/20/16	Sheet Number:
Check by: MAT	Job Number:	

ATKINS



004 PGL GRADE = $\frac{72.05 - 71.98}{20} = -0.0035$

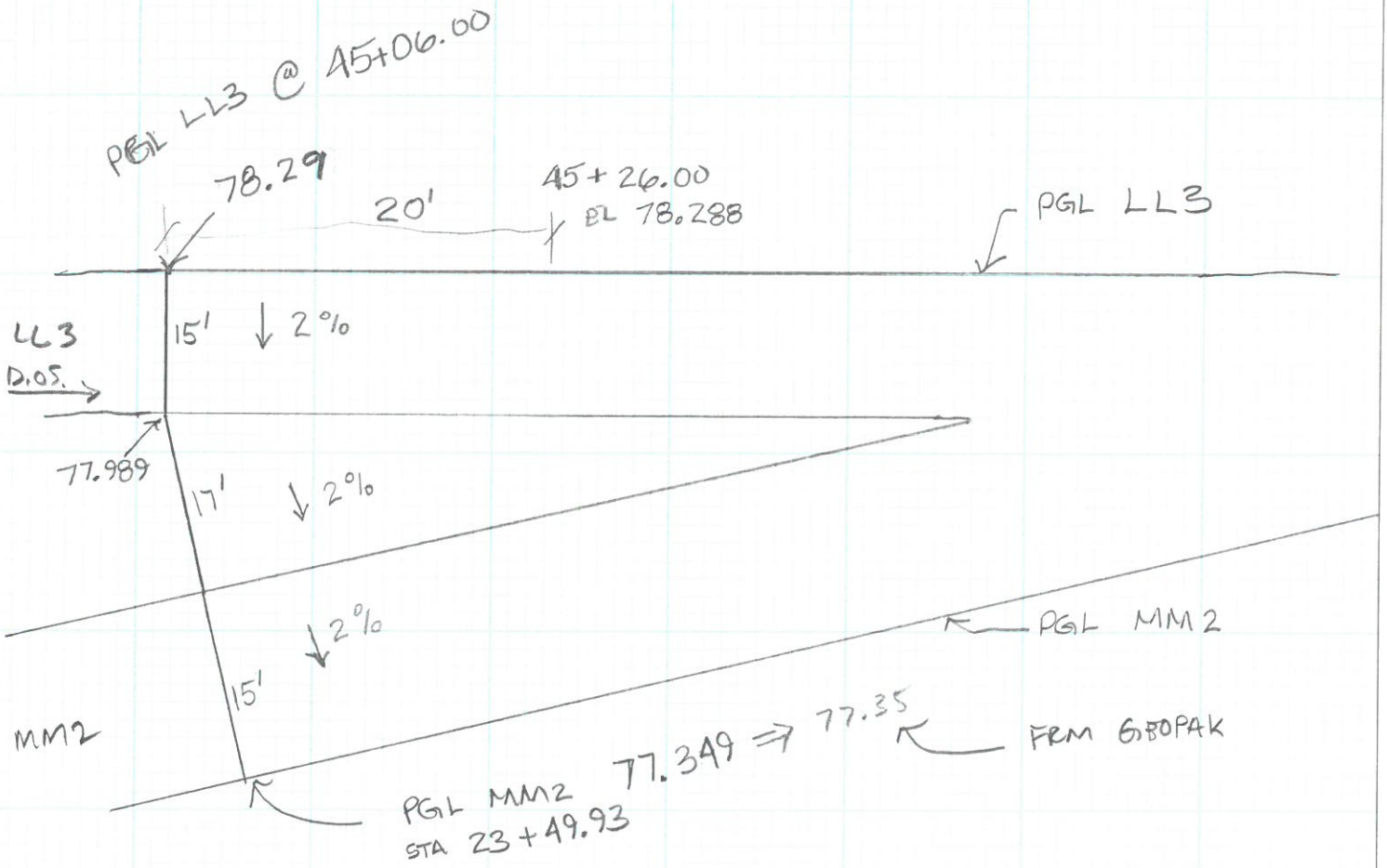
$EL_{CALC} = 73.04 - 0.021(15 + 17 + 15) = 72.05$

Subject: RAMP MM2 + LL3 GORE CALCS

ATKINS

Comp by: ABW | Date: 2/20/16 | Sheet Number:

Check by: MAT | Job Number:



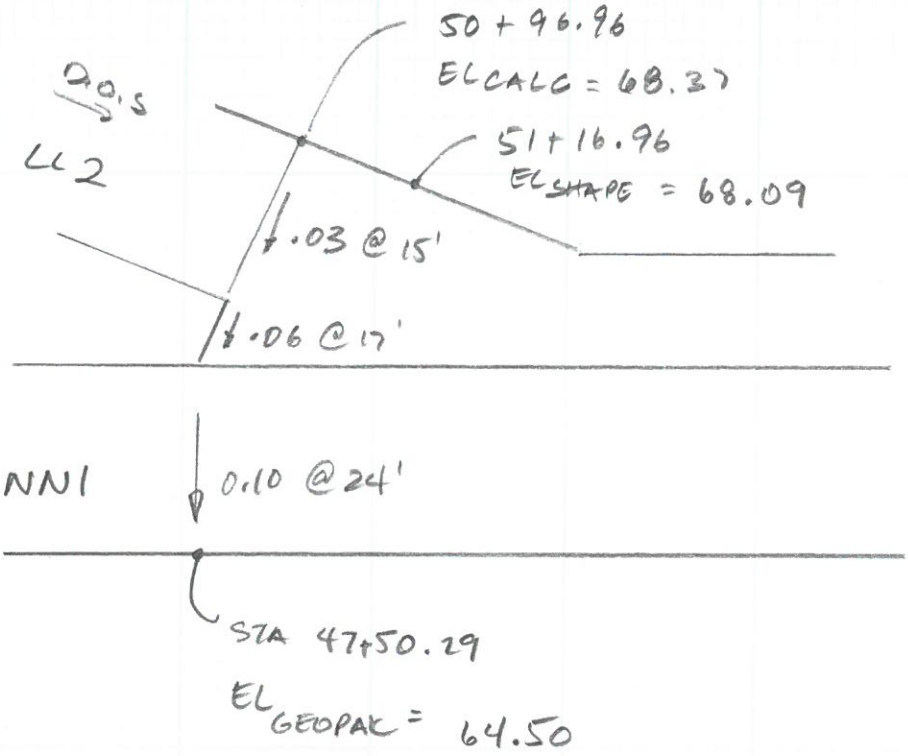
$$\text{LL3 PGL GRADE} = \frac{78.288 - 78.29}{20} = -0.0001 = \underline{-0.01\%}$$

$$\text{EL}_{CALC} = 77.35 + .02(15 + 17 + 15) = \underline{78.29}$$

Subject: RAMP TERMINAL DETAILS		
Comp by: / Check by:	Date: / Job Number:	Sheet Number:

ATKINS

NN1, LL2



$EL_{CALC} = 64.50 + 24(0.1) + 17(0.06) + 0.03(15) = 68.37$

$GRADE_{LL2} = \frac{68.09 - 68.37}{20} = -0.014 = -1.4\%$

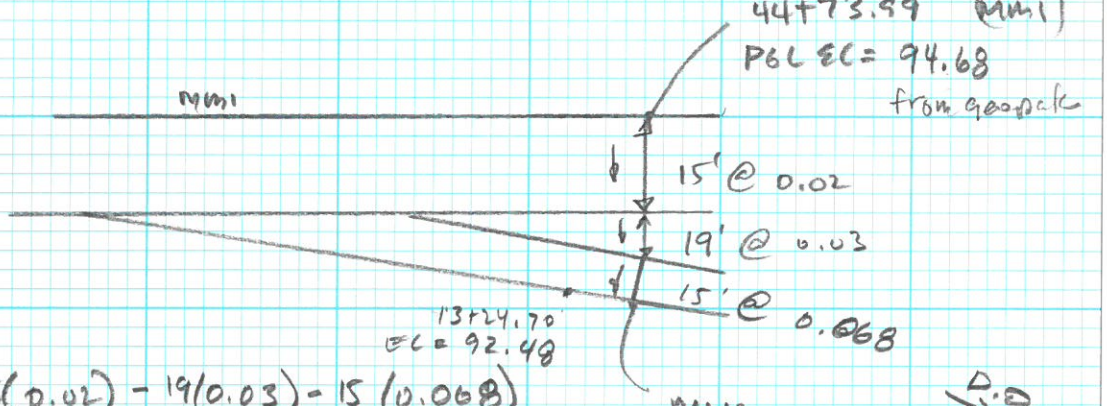
Subject: RAMP TERMINAL DETAILS

ATKINS

Comp by: | Date: | Sheet Number:

Check by: | Job Number:

MM1, MM2



$PGL_{MM2} = 94.68 - 15(0.02) - 19(0.03) - 15(0.068)$

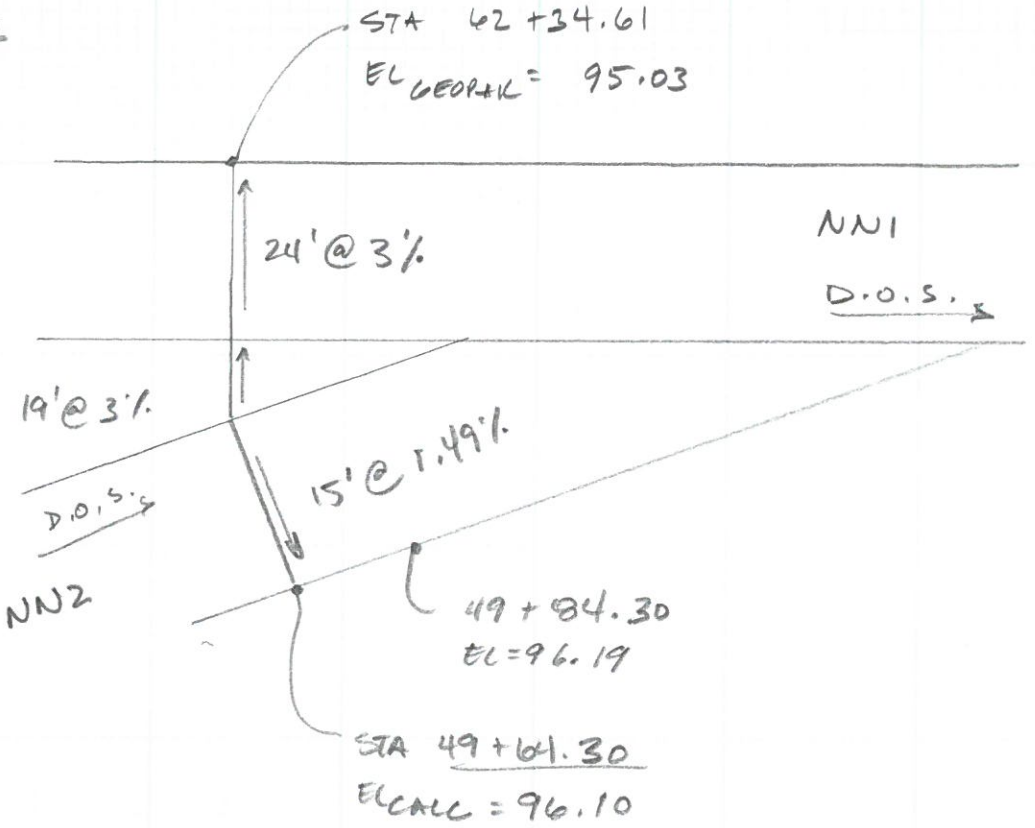
$= \underline{92.79}$

$\text{GRADE} = \dfrac{92.79 - 92.48}{20} = 0.0155 = \underline{\pm 1.55\%}$

Subject: RAMP TERMINAL DETAILS		
Comp by: / Check by:	Date: / Job Number:	Sheet Number:

ATKINS

NN1, NN2



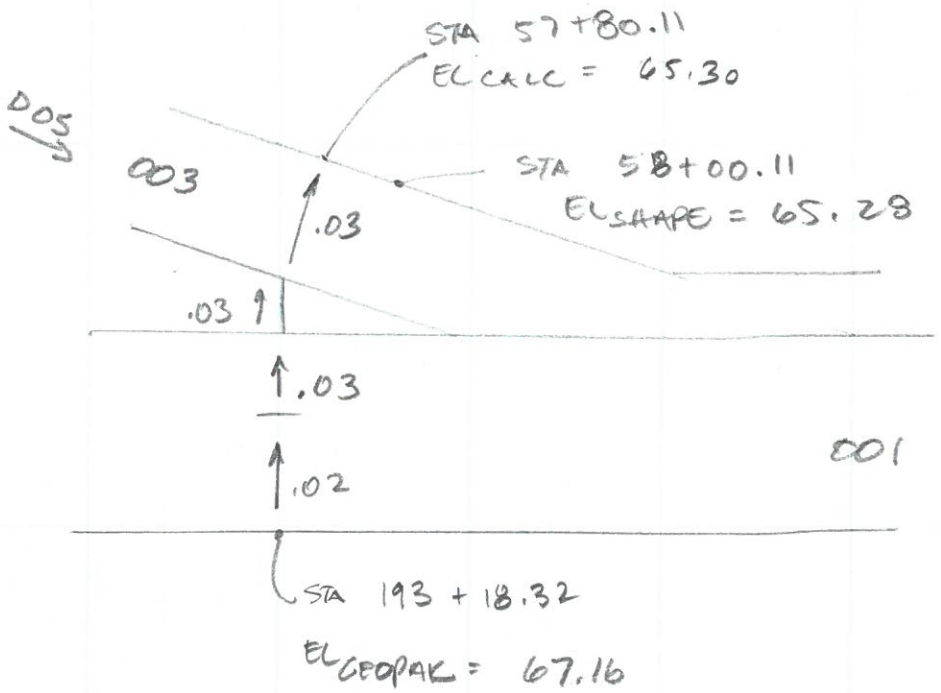
$$EL_{CALC} = 95.03 + 0.03(24+19) - 15(0.0149) = \underline{96.10}$$

$$\text{GRADE} = \frac{96.19 - 96.10}{20} = +0.0047 = \underline{+0.47\%}$$

Subject: RAMP TERMINAL DETAILS		
Comp by:	Date: 3-9-16	Sheet Number:
Check by:	Job Number:	

ATKINS

001, 003



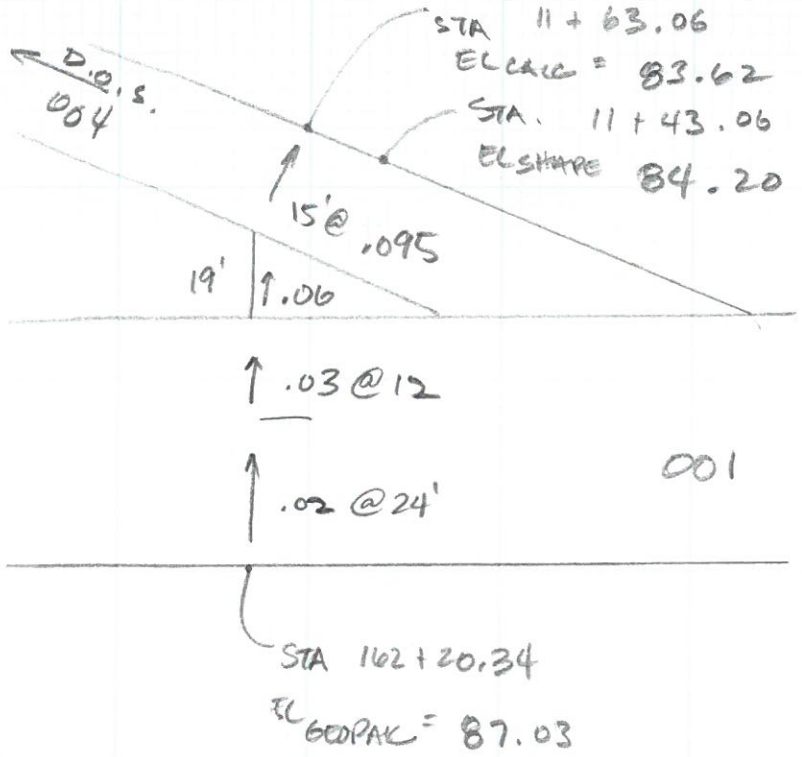
$EL_{CALC} = 67.16 - 0.02(24) - .03(12 + 19 + 15) = 65.30$

$GRADE = \frac{65.28 - 65.30}{20} = -0.001 = -0.1\ \%$

Subject: RAMP TERMINAL DETAILS		
Comp by:	Date: 3-9-16	Sheet Number:
Check by:	Job Number:	

ATKINS

001, 004



$EL_{CALC} = 87.03 - 24(.02) - .03(12) - 19(.06) - 15(.095) = 83.62$

$GRADE = \frac{83.62 - 84.20}{20} = -0.0287 = -2.87\%$

Section 7 – Misc. Design Documents

Edwards, Jamison R

From: Quartetti, Michael <Quartetti@pbworld.com>
Sent: Friday, January 15, 2016 10:48 AM
To: Edwards, Jamison R; Terwilleger, William A
Cc: Rank, Aaron E; Thorat, Abhay P.; Hodge, David
Subject: RE: I-4 braided ramp underpass concept
Attachments: RampEE2_Underpass.DGN

Jamison,
Attached is flat slab underpass concept for RampEE2. Shifting the ramp north does not really help the situation, the problem is ultimately the
small skew angle where the ramp first enters the underpass. There will be an unusual aspect of this particular structure at the entrance point.
A portion of the flat slab will be cantilevered over the Express lanes and ramp, this apparently is solvable with post tensioning
of the slab at the cantilever It might be restrictive and more costly than a conventional underpass but it is a solution and provides fun
challenge for a design build team. For the sake of bridge clearance calculations, we can suggest a 2.0 ft depth.

For a braided overpass with integral straddle bents we believe that a 7.0 ft structure depth is possible. This option would, as we discussed, require some
amount of substructure be constructed with the I-4 and CD WB lanes and shoulders.

Hope this helps,

Michael J. Quartetti, P.E.
WSP | Parsons Brinckerhoff
Senior Supervising Engineer
Main Number 813-520-4444
Direct Line 813-520-4349
Fax 813-520-4290

May 29, 2015

To: Rax Jung, Ph.D., P.E., Turnpike Project Development Engineer

From: Marc Hustad, P.E., PTOE, Design Manager, HNTB

cc: Pamela Nagot, P.E., Josh Pedersen, P.E., Emam Emam, PhD, PE, PTOE, Patrick Muench, P.E.

Re: Preliminary I-4 BtU Interchange Concepts at Wekiva Parkway (SR 429) and SR 417

On May 7 and May 18, a desktop review was conducted with FTE Design and Planning staff regarding the preliminary interchange concepts at I-4 Beyond the Ultimate (BtU) and Wekiva Parkway (SR 429) and SR 417. Please find a summary of comments and questions that were generated.

HNTB responses (provided on 7/6/15) are noted with a bullet point, and with red color text.

1. Providing complementary movements to/from I-4 express lanes and SR 429/SR 417 will provide better driver expectancy and consistency. Currently the concept includes a direct connect ramp from eastbound I-4 express lanes to SR 429/SR 417. However, there is not a return direct connect movement between SR 429/SR 417 to westbound I-4 express lanes. This situation is counter to driver expectancy. The direct connect ramp from SR 429/SR 417 to westbound I-4 express lanes previously may have been removed due to high cost and low traffic demand. Similarly, the traffic demand on the complementary direct connect movement between the I-4 express lanes to SR 429/SR 417 may be low. Instead, access to/from the I-4 express lanes to SR 429/SR 417 could be provided with ingress and egress slip ramps between express and general purpose lanes west of the interchange to accommodate access from the express lanes to SR 429 and SR 417. As another option, if the travel demand is high enough to warrant a direct connection in one direction, the complementary direct connect would also most likely be warranted.
    - It was determined that the travel demand from SR 429/SR 417 was low and the movement to I-4 westbound could be eliminated due to cost.
    - Slip ramps to and from the general use lanes are limited. There will be opportunity around Lake Mary to slip out of the express into the general use lanes.

2. As a follow-up to comment #1, it would assist FTE's desktop review to have design traffic volume assignments for each of the ramp movements to better assess demand, capacity, weaving sections and operational questions for each of the interchange movements including possible direct connections to/from the toll roads. This information should be requested from District 5's design team as a follow-up to this desktop review.
    - Traffic volumes can be provided.

3. As a follow-up to comment #1, the comment suggests flipping the ingress/egress slip ramps between the express and general purpose lanes to provide access from the I-4 express lanes to

and from the west to SR 429/SR 417; however, it would assist FTE's desktop review to have the current overall I-4 express lanes access plan to fully understand the ramifications to other access considerations impacted by this comment.

- Express to toll connectivity is the first priority. Toll to express connectivity is not being provided.
- The SAMR will address traffic operation concerns.

4. As a follow-up to comment #1, it would appear that removing the direct connect from eastbound I-4 express lanes to SR 429/SR 417 may allow better utilization of existing ramps and pavement.
   - Removing the connection would allow better use of the existing pavement, however for a system to system interchange; express to toll movement is a requirement of Central Office.

5. Some of the weaving sections are relatively short, a master signing plan should be developed for the interchange to confirm the concept can be signed (e.g., the weaving section prior to the choice of entering the express lanes from SR 417 west to I-4 express east may be especially difficult to place advance dynamic toll rate schedule signs). Similarly there are several driver maneuvers/exits that may have four destinations on the guide sign, these occurrences may overload the driver with information and should be confirmed by completing a master signing plan (e.g., a) westbound SR 417 exit at STA 66 has access to: 1) I-4 East; 2) I-4 Express East; 3) International Parkway; and 4) I-4 West – b) westbound I-4 Express exit at STA 2445 has access to: 1) SR 429 West; 2) SR 417 East; 3) CR 46A; and 4) I-4 West general purpose lanes).
   - A master signing plan is being developed for the I-4 BtU, which will be coordinated with the Wekiva Parkway project.

6. In 2007, the Turnpike completed a SR 417 PD&E for an eight-lane section between the Orange County Line to I-4. Current traffic trends are demonstrating the need for six lanes in the section between Rinehart Rd and I-4 in year 2035 and between 46A and Rinehart Rd in 2030. The additional capacity will likely take the form of an express lane(s) and be carried through Rinehart Rd. The interchange concept of SR 417 and I-4 BtU should consider the possibility of a future direct connection between SR 417 express lanes and I-4 BtU express lanes to/from the east.
   - This connection is not feasible at this time.
   - The design precludes the future connection between express lanes on both facilities.

7. As a follow-up to comment #6, the interchange concept should consider the future possibility of adding a continuous 5th and 6th through lane between SR 429 and SR 417 under I-4. This may already be accommodated in the interchange concept but should be confirmed with the design team.
   - This concept preserves the median for future widening to the inside. Special attention will be needed in design when placing bridge piers so as not to preclude future widening.

8. FTE has no current plans for an additional mainline toll gantry on SR 417 and SR 429 within the limits of the interchange. As a result, the current interchange concept includes non-tolled access movements to International Parkway and Rhinehart Rd. Currently; there are no plans to close these non-tolled movements. FTE's current understanding is that there is a mainline toll gantry on Wekiva Parkway just west of International Parkway.
    - You are correct; there is a mainline toll gantry west of International Parkway.

9. The previous traffic and revenue study did assume a continuous connection between SR 417 and Wekiva Parkway but did not include the I-4 BtU express lanes. An update to the traffic and revenue study may be needed to account for the conceptual express lane connections.
    - Comment noted.

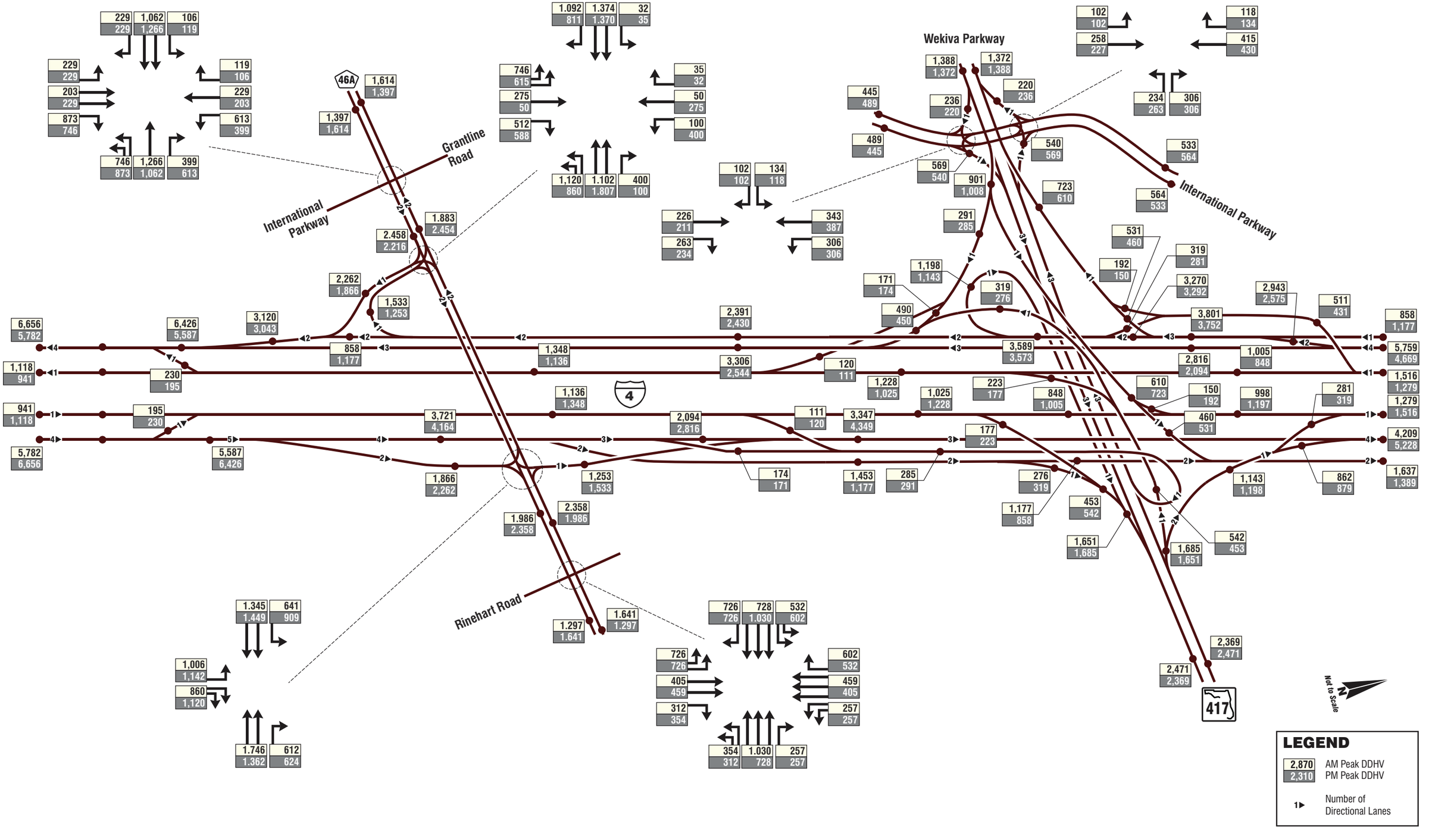
10. A few ramp profiles that overpass one movement and then underpass another movement may need to be checked to confirm the proposed grades and vertical clearances meet standards (e.g., I-4 eastbound express direct connect over general purpose lanes and under the CR 46A ramp).
    - It is difficult to see on the display, but the express lane connection actually goes under the I-4 general use lanes, and the general use lanes rise up over the express lane.

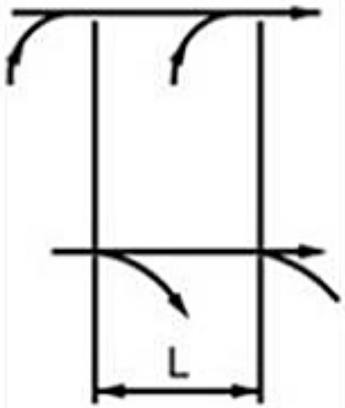
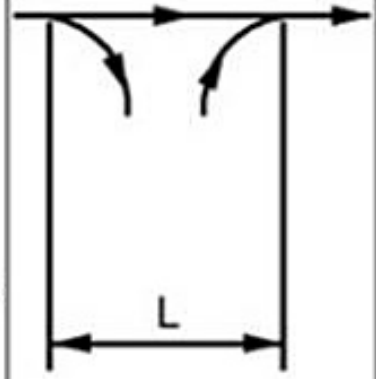
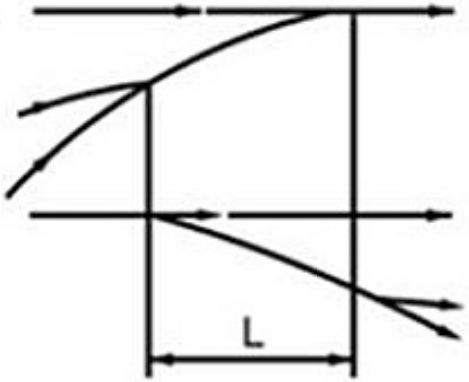
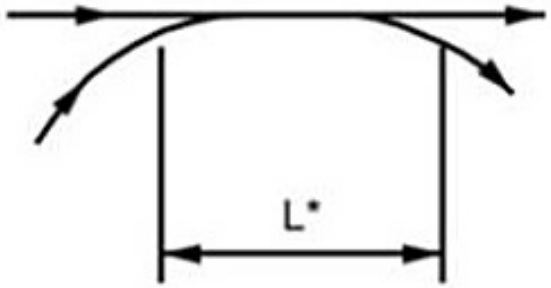
11. It appears that more lane capacity is needed at the merge of International Parkway eastbound/southbound to SR 417, I-4 westbound exit ramp to SR 417 and I-4 eastbound exit ramp to SR 417. These three movements are currently merged into a single lane.
    - The analysis included in the SAMR will provide evaluation for the proposed geometry.

12. Several weaving sections along the CD road and I-4 mainline should be checked operationally.
    - The analysis included in the SAMR will provide evaluation for the proposed geometry.

13. Ingress/egress to service interchanges are not consistent in providing access (e.g., a) SR 46 entrance ramp to I-4 also has access to SR 429 and SR 417 but the complementary movements from SR 429 and SR 417 do not have access to SR 46; and b) I-4 westbound express has access to CR 46A but 46A does not have access to I-4 eastbound express lanes).
    - This is the existing condition now. The conceptual signing plan will indicate how to access SR 46 from Wekiva and SR 417.

14. The Turnpike should be included in the System Interchange Modification Report (or possibly SAMR in this case).
    - A draft version will be provided upon completion.


Wekiva Parkway
Grantline Road
International Parkway
Rinehart Road
46A
4
417
Not to Scale
LEGEND
2,870 AM Peak DDHV
2,310 PM Peak DDHV
1▶ Number of Directional Lanes

EN-EN or EX-EX		EX-EN		Turning Roadways		EN-EX (Weaving)			
						 * Not Applicable to Cloverleaf Loop Ramps			
Full Freeway	CDR or FDR	Full Freeway	CDR or FDR	System Interchange	Service Interchange	System to Service Interchange		Service to Service Interchange	
						Full Freeway	CDR or FDR	Full Freeway	CDR or FDR
Minimum Lengths Measured between Successive Ramp Terminals									
300 m (1000 ft)	240 m (800 ft)	150 m (500 ft)	120 m (400 ft)	240 m (800 ft)	180 m (600 ft)	600 m (2000 ft)	480 m (1600 ft)	480 m (1600 ft)	300 m (1000 ft)

Notes: FDR—Freeway distributor road
CDR—Collector distributor road
EN—Entrance
EX—Exit

Figure 10-68 Recommended Minimum Ramp Terminal Spacing